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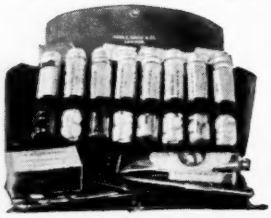

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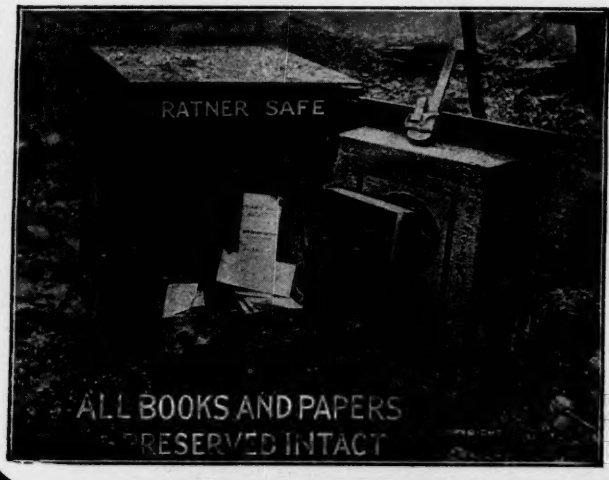


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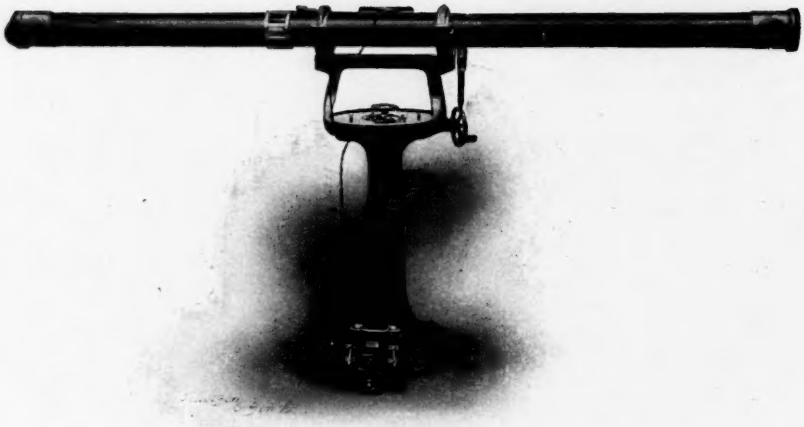

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The above photograph represents the MEMORIAL BUILDING erected by the Japanese Government in June, 1908, in honour of the Russian officers and men who fell in the Siege of Port Arthur. The inscription on the memorial facing the steps is in the Russian language. The photograph was brought from Port Arthur by Captain Chas. Slack.

*J. J. K. & Co., Limited, London.*

# THE JOURNAL
OF THE
# ROYAL UNITED SERVICE INSTITUTION.

VOL. LII. DECEMBER, 1908. No. 370.


[*Authors alone are responsible for the contents of their respective Papers.*]

## SECRETARY'S NOTES.

### I. OFFICERS JOINED.

The following Officers joined the Institution during the month of november :—

Sub-Lieutenant E. de F. Renouf, R.N.
Lieutenant J. G. Dill, Leinster Regiment.
Major H. C. F. Macdonald, late Seaforth Highlanders.
Lieutenant B. A. H. Woodd, Yorkshire Hussars.
Lieutenant A. W. Foster, Royal Horse Guards.
Captain P. E. Hodgson, R.E.
Captain E. C. Doughty, Suffolk Regiment.
Lieutenant H. S. Lecky, R.N.
Second Lieutenant B. N. Dalton, Bedfordshire Regiment.
Colonel C. H. P. Carter, C.M.G., Royal Scots.
Captain H. G. Gregorie, Royal Irish Regiment.
Second Lieutenant J. C. G. Thompson, R.F.A. (T.)
Major J. R. Wyndham, Wiltshire Regiment.
Captain H. F. W. Bircham, K.R.R.C.
Lieut.-Colonel J. R. Hanson, 5th Bn. Durham Light Infantry.
Captain A. H. W. Haywood, R.G.A.
Lieutenant R. H. Howell, Indian Army.

### II. GOLD MEDAL ESSAY, 1908.

The following additional Essays have been received :—

"*Omnium Viribus Virtute Communitate*" (A).
"*Nec Propter Vitam Vivendi Perdere Causas.*"
"Out of Smoke to give Light."
"Nothing Venture, Nothing Have."
"Confido."
"*Omnium Viribus Virtute Communitate*" (B).
"Whomsoever Commands the Sea, Commands the Trade, etc., etc."

## III. THE STAFF OF THE INSTITUTION.

The Council has decided at the end of the present year to divide the office of Editor and Librarian. Captain H. J. G. Garbett, R.N., will be the Editor, and Major C. H. Wylly the Librarian.

## IV. THE COUNCIL.

The following Members of the Council, having completed three years' service, will retire at the Anniversary Meeting on 2nd March, 1909:—

Brigadier-General C. G. Donald, C.B.
Colonel Lonsdale Hale.
Colonel Hon. O. V. Lumley.
Colonel W. A. Hill, C.B.
Colonel R. B. Colvin, C.B.
Colonel T. S. Cave.
Colonel W. C. Horsley.
Commander W. F. Caborne, C.B., R.N.R.

## V. ADDITIONS TO THE MUSEUM.

*a.* A Sepia Drawing, executed by J. Waters in 1812, of the painting by F. Pocock, of Lord Nelson's birth-place, "Burnham Thorpe Rectory, Norfolk." The picture was engraved by J. Landseer. *Given by C. W. Everard, Esq.*

*b.* Shako Plate of the 33rd (Duke of Wellington's) Regiment. *Given by Lieut.-Colonel J. C. Duke.*

*c.* Three Coloured Prints, by R. Dighton, being representations in caricature of:—

The Marquis of Hastings, 1804.
Sir David Dundas, 1810.
The Military Caricaturist, 1799.

*d.* Two Photographs of Illustrations by A. M. Mallett, 1685, of "Fire Pots and Fire Balls," and "Grenadier with Grenade." *Given by Colonel H. R. H. Southam, V.D.*

*e.* Ring taken from a dead Sepoy by an officer of the Naval Brigade at the taking of Lucknow. *Given by Captain A. Foster.*

*f.* An Engraving showing the Funeral Car of Field-Marshal the Duke of Wellington, K.G. *Given by B. E. Sargeaunt, Esq.*

# THE TRAINING, ORGANISATION, AND RAPID CONCENTRATION OF A FORCE TO RESIST RAIDS OR INVASION BY THE STRATEGICAL USE OF THE MONO-RAIL.

*By Vice-Admiral Sir C. CAMPBELL, K.C.M.G., C.B., D.S.O.*

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On Wednesday, 29th January, 1908.

Sir JOHN WOLFE BARRY, K.C.B., LL.D., F.R.S., in the Chair.

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THE paper I am about to read is the outcome of a careful study of a brilliant essay on "invasion" written by the "Military Correspondent of *The Times*," and published in the November number of the *National Review*. Doubtless that article has been read by many present, and I will not take up your time by lengthy quotations. The general principle, in so far as my present effort is concerned, is expressed in the first paragraph: "If an invader lands in Great Britain and compels us to sign a disastrous peace, the disruption of the Empire follows as a natural consequence. For this reason "home defence" should have the first place in our thoughts when we consider questions relating to our security."

I take this article as the gospel of the school of thought which places reliance on the capability of the fleet to seal the enemy's ports and keep him from putting to sea but which nevertheless is convinced of the paramount importance of the training and organisation of a sufficient force to safeguard these islands in the event of disaster. Saturated as I am with conviction as to the absolute necessity of national, naval and military training, and trusting that the nation will ere long insist upon steps being taken to secure it, I propose to supplement the essay above quoted and bring to your notice for discussion a scheme to increase the mobility and facilitate the sudden concentration of whatever force we may possess (no matter where it may be distributed or of what it may be composed) on or before the arrival of the suggested invader.

With your permission I will take for granted that the various authorities who have spoken and written on the sub-

ject of "Raids," are correct in the unanimous conclusion they have arrived at, which, as far as I have been able to ascertain, is "that during the temporary absence, or by skilled evasion of the fleets, *a raid is possible.*"

My object this afternoon is to raise a discussion, first as to the paramount importance of national training to create a force for national defence; secondly, on the necessity of a carefully prepared, rapid system of concentration on any spot chosen by the invader for landing; and finally, on the most suitable and economical method of traction to extend the existing lines of railway to all possible raid areas.

The problem, I take it, is first to raise the force; and that is a trouble which is at the present moment exercising many minds. The National Defence Association is facing it, the National Service League is making superhuman efforts to establish universal naval and military training throughout the Empire, and those in authority have launched a scheme of county organisation, which, though some critics may differ from it in points of detail, we all hope and trust may succeed in increasing and improving the Foreign Service Army, and creating a force for home defence.

In the words of the League leaflet, "Safeguard the nation against war by showing that we are prepared for it, and insure that, should war break out, the whole national forces may be brought to bear in order speedily to re-establish peace." That is a point I wish to emphasise, and implore every man, woman and child within the realm to support it.

I propose that national training should be attempted through the leverage of the much-talked-of "old age pensions." Except in cases of ill-health, or other physical or mental unfitness, no able-bodied man in our islands should be eligible for an old age pension unless he had qualified in youth, and kept himself qualified, to defend his home, and had been continuously ready at short notice to form part of the force which might suddenly be called upon to resist invasion.

If our male population kept themselves so trained, and so ready as to secure peace during their manhood, I am sure no one would grudge them a state pension to lessen the burden of their declining years.

I deny that national training could under any circumstances be called compulsion. If the people, through their representatives in Parliament, passed a law for universal training, it would simply relieve the patriot from carrying the burden of the loafer in addition to his own.

The second portion of the problem is to collect the force, scattered all over the country as it must ever be, with its guns, horses, camp equipment, commissariat, etc., and transport it to the required spot in sufficient strength to annihilate the invading army. To deal with this portion of the problem, I would suggest a Board composed of representatives from all railway companies and experts from such Government offices as are interested in the question of "National Defence."

I feel certain that the Light Railway Commission have collected an enormous amount of most valuable information, which would be of the utmost importance to a Board who were considering the necessity for strategic lines in connection with national defence, and which would solve the problem of collecting and concentrating the greatest possible numbers of armed trained men.

In the words of Napoleon, "L'art de la guerre n'est autre chose que de réunir plus de monde que l'enemie sur un point donnée."

It is therefore the business of our strategists during peace to organise and exercise and thoroughly prepare to concentrate the greatest possible fighting force on even the most improbable places at the shortest possible notice.

It would be sheer waste of time and energy to select any locality, or even a number of localities, for which to make special plans and arrangements. To be complete and effective our scheme must be available for all parts of the coast, first and foremost, from the mouth of the Thames to Peterhead, then from John o' Groat's house to the Land's End, and from Land's End to the North Foreland. The West Country gamekeeper, who had spent his life at war with invading poachers, was not far out when he came to the conclusion "that them places as is least likely are often more likely than them as is most likely." Anyway, his statement demonstrates our position round our coast.

The "raider" will not, I presume, select strong positions, so we must be *ab omne parte paratus,* and we may base our expectations on the experience of the great Duke of Wellington, who said "that when he retired for the night he was in the habit of thinking over the position and considering which was his weakest spot," and he was sure to find that Marshal Soult had discovered it ere morning.

I submit that it is vital to our strategy as a nation, possibly on the eve of war, that ere we sleep we prepare at every point for the coming night, for surely the reflection of the past is glaring at us in the future, and all history does not lie in enunciating the prediction that we shall be attacked where we least expect, and when we are least prepared.

My contention is, that we must not only be in a position to concentrate instantaneously but also to have the power of moving the defending force from one weak spot to another promptly and systematically, and take up new positions at the shortest possible notice. The sea is our frontier, and we must guard its shores in the same manner that other nations guard the passes of their land frontiers. Were it not for the prohibitive expense I would advocate a tube mono-rail right round our coast-line, thirty feet or more below the surface. We live in days when news flies apace and celerity is the dominating factor in all operations, whether for peace or war.

No doubt if we are fully prepared in men, arms, and transport, wireless will give us sufficient notice, and it

only remains for us while there is yet time to make sure that we have not only sufficient trained men and arms, but also a complete and rapid means of transporting them. I would point out and emphasise the fact that the proposed system does not in any way interfere with the existing railways, but is suggested as an addition, especially on outlying strategical routes, which would be all-important when the foreseen necessity arises, and which are at present without railway communication.

In the words of the military correspondent of *The Times*, "numbers are necessary for the land defence of an insular State, first, because these numbers compel the enemy to increase his forces, greatly enhance his difficulties, and shake his resolves; secondly, because when an island can be attacked at all it can be attacked at almost any point, and it cannot concentrate its attention for years in advance on a limited extent of frontier as a Continental Power is able to do. .There must be initial dispersion on the part of the defenders, however contrary to principles, because the enemy cannot be allowed to land in peace, to seize important centres, and to organise his advance without meeting with prompt and effectual resistance. These conditions imply numbers and the close study of railway strategy. The better the quality of these numbers and the better the railway strategy, the better will be the defence. It is better for us that we should devote our attention to the creation of field armies and to the improvement of their strategic mobility by means of a close understanding with the railway companies than that we should waste our resources upon passive defence."

That is the keynote which set me to work to try and evolve a scheme to place before you, and a method of traction whereby it could be carried to a satisfactory development, combining the maximum of efficiency with the minimum outlay. With the foregoing objects in view it was natural that I should look round for a system of traction which would best answer the purpose of extending our various railway systems which traverse the land in all directions, so as to give easy access to every landing place which might possibly tempt an invader or raider.

By a curious and fortunate coincidence I happened to sit next to a gentleman at lunch, and during our conversation he told me that a friend of his had patented a system of mono-rail with side-wheel spring support, a sort of cross or combination between a gyroscopic mono-rail and a motor 'bus, which seemed to me to be exactly suitable for the purpose I had in view. He very kindly promised to obtain for me the model you see before you to-day, together with plans, specifications, etc. I accepted on the condition that as the inventor was of Belgian origin, if ever the patent was used in this country the work should be done by British hands and the material should be of British manufacture. I wish to state clearly that it is not my business or intention to cry up any particular invention, but to prove the necessity for some system. I will describe that which, as far as I can judge, is the best before the public to meet the

case, and I would ask any gentleman present, who knows of a more suitable invention, to bring it forward in discussion.

### The Isopede, or Side-wheel Mono-rail.

The Isopede—the great and increasing development of automobilism and its adaptation to the transport of heavy weights—has not given all the practical and economical results which were expected of it, and the question as to whether perfection lies with the automobile or the rail, remains open. Will the question be solved by the rail becoming more expeditious, economical, and efficient, or by the perfection of automobile transport?

If the railways have proved their usefulness for three-quarters of a century, they are not always economical; they even become very costly when they cannot adapt themselves to the exigencies of existing roads, and demand special works, involving enormous capital. Over-capitalisation is a disease from which every company in this country is suffering, more or less.

The automobile is more supple; it can be driven along almost any road, and requires no laid track. But on the other hand, it has against it the uncertainty of the direction and the state of the roads, thereby reducing its speed when coupled up. The "Isopede" borrows the good points of the railroad, which it reduces to a single rail, and its mobility from the automobile. We get, as a result, a happy union of the best qualities of each of these modes of transport, while we avoid their imperfections.

The Isopede mono-rail has all the desirable qualities for economical transport, and would be admirably suitable for any light railway. The following points are suggested in its favour:—

1. The running way is reduced to a single rail at a cost price of approximately one half of a double-rail track.
2. Rolling stock, adapted to the above, is provided with single carrying wheels running on the mono-rail, and equilibrium wheels resting and running on the ground. The mechanical union between these two types of wheels is such that the load is borne almost entirely by the centre rail.
3. Any irregularity in the side-wheel track is not transmitted to the vehicle, and the running of the carriages is as smooth as on a double track, if not more so.
4. As may be seen by the model, the Isopede turns with safety any curve, and will take with ease a circle described within a radius of fifteen feet. It is therefore more supple than an automobile, and will travel without the least danger over the most sinuous roads.

5. A long train can be made up, and coupled to an engine, with even greater advantage than on a double track.
6. The conducting rail assures perfect security, and running off the line is almost impossible, and as yet unknown.
7. The single rail halves the number of points required in changing roads.
8. All things equal, on level ground, the cost of laying a mono-rail track is about £300 per train mile. For the same carrying capacity of traffic the corresponding price of a double-rail track would be over £600.
9. The Isopede can take gradients with almost the facility of a funicular railway, thereby minimising cutting and tunneling in construction.
10. The Isopede adapts itself to the necessary conditions of rapid and economical laying and to the roughness and inequalities of the land in the possible districts where concentration may be required.

To sum up: By its extreme economy, by the suppleness of its movements, which allows the Isopede rail to be established on the most sinuous roads and to get round all obstacles, this new mode of transport indicates itself as eminently suitable to extend existing railway systems to outlying or feeding districts. As small streams combine to swell great rivers, so these lines might be used in peace to swell the traffic returns; and in war, in the opposite direction, to concentrate force gathered from distributing centres.

In addition to the already mentioned advantages it will be seen that there is a great gain in rapidity of construction, which always means a further economy.

For my purpose to-day great speed is not absolutely necessary. Theoretically the Isopede is capable of attaining higher speeds than the bi-rail; but, practically, I think we should find that the side wheels would also have to run on small rails, and so reduce the saving in expenses. We are only on the verge of the development of the mono-rail as yet, and possibly the gyroscope may solve the problem of high speed. I am convinced in my own mind that the Isopede is the best system of traction yet invented for the purpose of feeding main lines, and from the national point of view, for the far more important duty of concentrating trained men, guns, ammunition, and all the paraphernalia of an army of defence, in the event of invasion. That is my definite conclusion, and I place it before the meeting for what it is worth.

I submit for your consideration and approval, "that the one aim and object of all study and discussion is to arrive at some more or less definite conclusion as to the trend of possibilities in the near future. Get all the information you can lay hold of, relating to the subject under review, study it, sift it,

and digest it, and work it up to date, and then set your brain the task of evolving from the material furnished by the past, the most strategical and economical line on which to advance."

Having arrived at the limit of your capacity as an individual, it is wise to lay your conclusions before as many experts as you can gather together, and hear from them the faults and fallacies which are as prolific in the best trained brain as weeds in the most carefully cultivated garden.

After thirty years' experience and many attempts to raise debates on naval questions of the day, I am convinced that nowhere can this be done with a more sagacious and sympathetic audience than at the Royal United Service Institution.

It is for this reason that I obtained permission from the Council to address you on one of the subjects of national interest to which I have determined to devote what remains of me of fervour and energy after the forced close of my active career in the public service.

They are briefly as follows:—

1. National training.
2. Concentration of military force in any threatened area by improved railway facilities.
3. Concentration of naval force at will in the Atlantic or North Sea by cutting the Forth and Clyde battle-ship canal.
4. The strategic unity of the Empire by establishing the all-red route to Australia, New Zealand, and Hong Kong, *viâ* Canada!
5. The tube railway to the Continent!
6. A national war fund and a varying export duty on gold.
7. Internal combustion in battle-ships! No boilers, no funnels, no masts.
8. International arbitration.
9. The conquest of the air.

All these proposals, if they are carried out by private enterprise, should receive the active support of the Government; and if private enterprise is wanting, it becomes the duty of the Government to insure the maximum of national security at the expense of the nation.

They come under the head of National Strategy, and I take this opportunity of bringing them to your notice, though they are not intended for discussion to-day. In my humble opinion, there should exist a strategy, non-political department permanently established (no matter which party is temporarily in power) for the sole purpose of dealing with these all-important subjects. I am far from advocating them as menaces to other Powers, but as the surest means of maintaining peace and insuring the security of the Empire! Let us use our

brains during peace to prepare our forces and make our home so secure that no enemy, however powerful, will dare to visit us with hostile intentions, or if he does—in the concluding words of the "military correspondent of *The Times*"—"we may be able to maintain the traditions of British hospitality, and give him (the enemy) the warmest possible reception." This is only to be accomplished by every man, woman, and child putting their shoulder to the wheel. The individual who says "I cannot do anything," never did and never will do anything! He or she who says "I'll try" often succeeds; but it is the man or woman who says "*I will*" and means it who works miracles. There is a means by which you can all give expression to your will, here and now. Join the movement so energetically inaugurated by the National Service League and National Defence Association, by inscribing your names and addresses on the rolls of these patriotic societies for the training of our manhood and the defence of our country. If I only gain one recruit, gentleman or lady, I shall feel that my humble effort to bring one of the many points of detail to your notice has not been made in vain.

Vice-Admiral W. F. S. MANN:—I propose only to deal with the first part put forward for discussion. The paramount importance of national training to create a force for home defence. I recognise the absolute necessity of a supreme Navy; but, unlike those of the extreme Blue-Water School, I believe that a Navy, however strong, has its limitations; that under certain quite imaginable conditions invasion is possible, and therefore that a shore defence force is required. I also hold that a Navy alone cannot finish a war. After the Navy has gained command of the sea we want a strong Army to complete the job. Our professional or standing Army can only be of limited strength, as the Navy must at all costs be provided for; therefore, it must be largely reinforced in war time. The lecturer, like myself, is a member of the National Service League, presided over by Lord Roberts, and we are in agreement that the only method of expansion is some form of compulsory universal training. A Statesman of great ability has been given a long time to think out the problem, and lately he has been explaining his views at great length. So far as I understand this scheme, it appears to provide the machinery for setting up a real Territorial Force; but where it fails—where we think any scheme will fail—is that there is no certainty of obtaining the men, because it is left to voluntary enlistment. Even if the fourteen divisions are filled, though they will be better organised, they will be no better drilled than the present Volunteer corps, nor will they be so until some considerable time after embodiment, which is not to be until war breaks out. Under these conditions, at the commencement of hostilities, they will be unfit to meet trained troops. What we of the National Service League ask is that it should be made the law of the land that physical training of a military character and instruction in the use of the rifle should be part of the curriculum of all schools—continuation of this training up to 18 for boys who leave school before, in cadet corps, etc., and when they arrive at the military age, every man of sound physique, without distinction of class should be liable to undergo three or four months continuous training. If this were the law, the Territorial Army would be a real force, something similar to the Swiss system, and the nation would be

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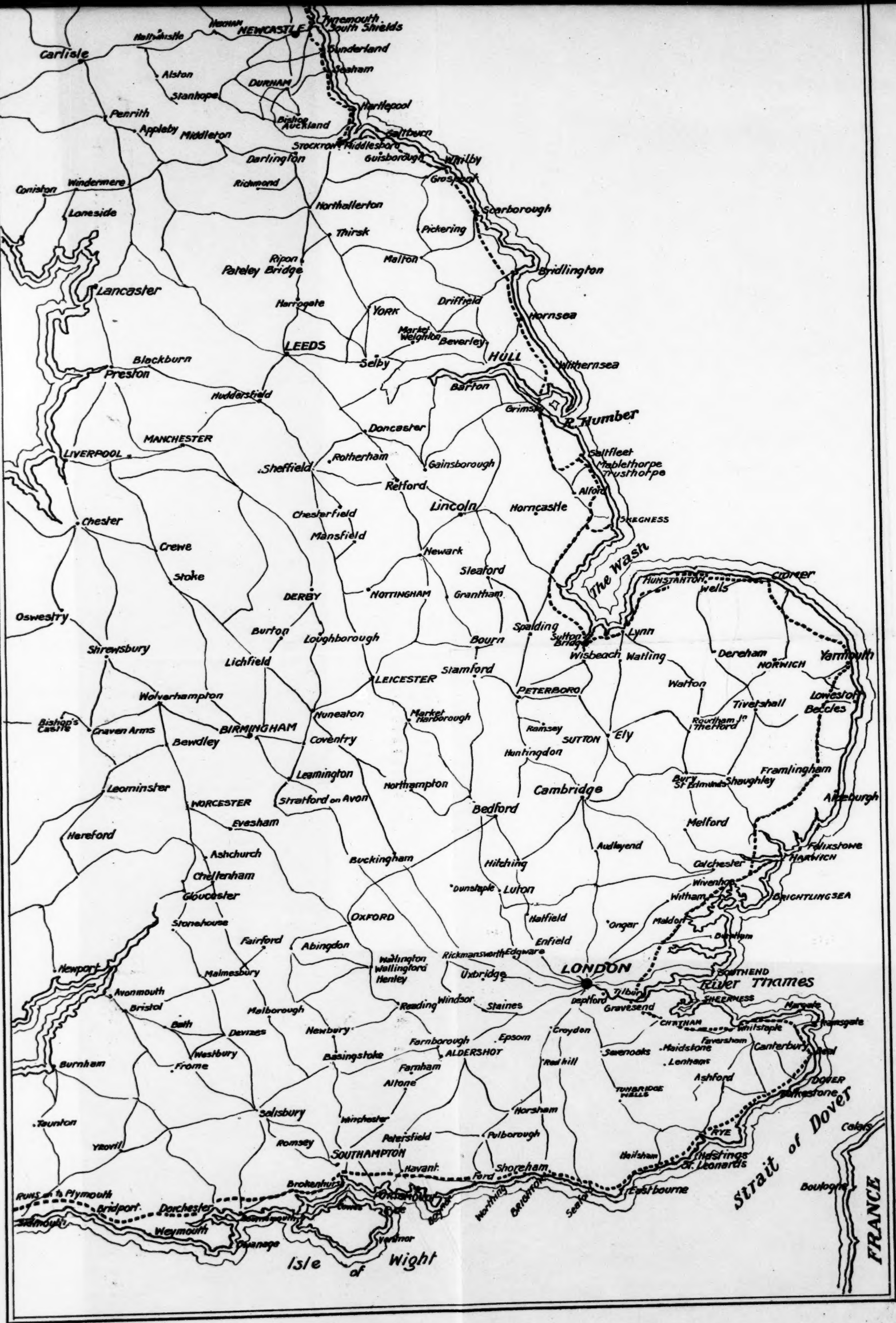


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trained to arms. Then, in time of stress, when Volunteers were called for to expand the Regular troops they would be fit to do so, which they have never yet been. Remember how in the late war men had to be taught to ride and shoot after they arrived in South Africa. When it is known on the Continent that an organised home Army exists, invasion schemes would be dropped, the Navy would be free to seek out and destroy enemy's ships, and we might then really sleep soundly, conscious we had made our preparations in time.

Mr. R. ELLIOTT-COOPER, M.Inst. C.E. :—I propose in the few remarks which I have to make to keep strictly to the various special points mentioned in the paper. I think that we may conveniently for this purpose divide the paper into two parts: one dealing with the general broad fact of the necessity in times of peace of making preparations for the movement of large bodies of troops to different points along the coast as may be required in the time of war, and the second is the special mode by which that is to be accomplished, bearing in mind the fact of the direction and the capacity of the main line railways, with which any subsidiary lines must necessarily be connected. Possibly many here may not know that there is a body, which has been in existence for a good many years for the purpose of dealing with this question. I mention this because Sir Charles Campbell says at the beginning of his lecture (p. 1612) that he thinks as a preliminary step it would be desirable, in order to deal with this portion of the problem, that a Board should be formed composed of members having practical technical knowledge, not only of the movement of troops, but of such engineering details as would be necessarily involved. I may mention that that Board has been in existence for many years. It is called the Engineer and Railway Volunteer Staff Corps. Its officers are composed of the general managers of nearly all the great railway companies, and there are an equal number of engineers who are in consultation with them to carry out their ideas for the transport of troops. A member of this corps, Lieut.-Colonel Findlay, to give him his military title, read a paper before this Institution in 1890 upon this subject, but treated it, if I may be allowed to say so, in rather a broader manner than is indicated in the paper before us. He took as the principal point in his problem an army corps situated at some camp in the interior. The problem to be solved was how those troops were to be conveyed in the most expeditious manner to some point which was liable to attack along the coast. He showed that with an army corps as it was composed then—I am not sure whether I should be correct in saying it is the same now—he would have to employ 150 trains to convey that army corps in the quickest possible manner, with the necessary horses, munitions of war and all the various *personnel* that would have to go with the troops. Therefore, the problem that has to be considered is: how, when you have got those 150 trains to some point near the coast, which turns out, when they have got there, not to be exactly where they were then required, on account of the supposed point of attack having been changed, how the troops could be moved forward quickly in order to bring them into practical use. Those are the problems which this corps has to deal with. I may say that in the discussion which followed the reading of the paper Sir Redvers Buller made these remarks: "It is a great advantage to have this general problem of the movement of large bodies of troops in cases of immediate emergency discussed. I know officially what an immense help to the Quartermaster-General's Department the Railway and Engineer Volunteer Staff Corps have always been. They have once or twice worked out for us very considerable

schemes most admirably, and I think we are going very shortly to show our gratitude by giving them a still larger and still more comprehensive one to work out." That was the view which Sir Redvers Buller took. I merely mention this as showing that the suggestion which Sir Charles Campbell now makes has really in effect been in working operation for a good many years. The officers of this corps meet, not always for very important business, every quarter, when they can discuss such questions as may come up. The problem which this paper more particularly deals with, however, is, as I said before, the one of how you are going to distribute that force to certain definite points after they have got, as I understand it, into the neighbourhood of the coast, because I think it must be allowed that any circular railway such as that which has been suggested by Sir Charles Campbell could only be of practical use after the troops have been sent by the main lines to some point. The existing depôts, if I may use that word, would, I understand, be most conveniently kept in the positions they occupy at present, because from those centres by means of our existing railway system large bodies of men could be taken in the shortest possible time to any particular point far more rapidly than they could possibly be taken by any other railway, whether it is the one before you (Plan) or other lines running round the coast. I will take, just for the sake of defining that point, the imaginary suggestion that the Wash, which has been mentioned before in the course of the proceedings, was going to form the centre of attack. The troops would be brought from the nearest camp and landed, we will say, at King's Lynn. When the troops got there, or were on their way there, it might be found that the point of attack had changed further south, say Cromer, and therefore the question is: How can those troops be expeditiously and conveniently transferred from the point where they were supposed first to aim for to the new point of defence? There this question of the subsidiary railway comes in, and I have no hesitation whatever in saying that any railway that is materially different in its system from that which is already in use in this country would be an entire and hopeless failure. The great point which has to be considered is the absolute necessity of avoiding detrainment and all unnecessary unloading and loading up of troops and munitions of war. If you have, we will say, a mono-rail system of railway or a break of gauge, it is impossible for the main line trucks of the existing railways to run on to the subsidiary railway, and all the advantages possessed by that railway would thereby be lost, because the time occupied in detraining and entraining troops, munitions, and horses might be fatal. That was clearly shown in the paper to which I have already referred, in which it was pointed out that a large part of the time occupied in the movement of troops is in putting them on board the trains and taking them off again. Assuming that is so, the question is: What sort of railway can accomplish the desired object? Most of us know what are called light railways. Light railways are nothing more really than railways made economically, keeping as near to the surface as possible, with steep gradients where necessary, and using comparatively light rails, the rails being sufficiently heavy for the conveyance of the coaches and trucks, but not sufficiently heavy for the main line engines. Those lines being of the same gauge as the main lines can do everything that a system like the mono-rail system can do, and a great deal more. To emphasise that, I will compare what would happen on what I would call the ordinary system with what would happen if a line of this kind were made. In the first place, I think the inventor of this system has rather gone beyond the scope of what he could reasonably have been

expected to do. I do not wish to say a word against it, or what I imagine is its legitimate object, namely, as a tramway along the street. I can quite see that for that purpose it could be economically constructed, because it would be a sort of cross between a motor omnibus and a tramway; it would only have one rail to supply the power and two wheels to assist it in running along the road. But if you came to lay a railway of this kind along our uneven coast-line, it can be seen by anyone who has walked along our Downs or along any of the ups and downs that are met with in a day's walk, that you could not possibly do it, because if the ground were "side-lying," as we call it, that is, at an angle sideways, you would have to make a roadway in order to get it approximately level, just the same as if you were going to lay an ordinary two-line track upon it. I therefore am at a loss to understand where the economy would come in so far as that is concerned. Then Sir Charles Campbell mentioned another matter, in connection with which, not being an engineer, he naturally took his information from someone else, no doubt the inventor. I desire to point out that the suggestion he has made, that one great advantage of this system is, that the trucks will go round curves of a 15-foot radius, is quite illusory. No doubt a single wheel will go round such a curve, but in order to get the tractive power that would enable it to carry anything more than about its own weight you would have to couple together a certain number of wheels. In the drawing which I saw this morning, which was suggested as being applicable to this particular case, four wheels were coupled together; and if you couple them together in the way suggested you practically make those four wheels in a rigid straight line—what we call the "rigid wheel-base." I am sure, therefore, it is perfectly clear to everyone that you could not put a straight line of at least 8 feet on a rail and make it go round a curve which only has a 15-foot radius. That is one of those fallacies which, in talking about these things in a general way, one is apt to tumble into. Then, as I said before, if you do not couple your wheels together you get no power at all, because the power exerted by a locomotive is, if I may put it in that way, two-fold. First of all you have the tractive force, that is, the power of the locomotive through its pistons to turn the wheels; and, secondly, you have the adhesive force which makes those wheels adhere to the rails and move the conveyance forward. Therefore, so far as that goes, you gain absolutely nothing whatever with this new system. Exactly the same remark applies to the supposed economy—there is no economy gained either. If you have one rail it has to carry a certain weight. I notice from the drawing which I saw this morning that it is suggested there should be ten tons weight on each of these four wheels. That one rail would thus have to carry four 10 tons, and therefore it is perfectly manifest that if you have two rails the weight on the axle being 10 tons, there would only be 5 tons on each rail, and therefore your two rails could be half as strong as the one rail. You gain absolutely nothing, therefore. All the points I have mentioned so far are points where nothing is gained. I would now like to refer for a moment to the great number of advantages which would be lost. First of all, in the conveyance of troops and munitions of war it is absolutely necessary that the movement of those troops should be rapid, and that no unnecessary delay should occur. It has also been suggested in the paper that these subsidiary railways might be capable of being used during times of peace for commercial purposes. If that is to be the case, it is equally important that a truck which is going, we will say, to the Midlands or to one of the big towns from a particular farm on the line of this subsidiary railway should be of the same gauge as the line upon

which it has to travel, otherwise the whole of the produce has to be unloaded at the point at which it joins the ordinary main lines of the country, and all the expense, inconvenience, and trouble will have to be gone through again of unloading and reloading that farm produce, or whatever it may be, which would have the effect of entirely killing the traffic. This idea of subsidiary railways for the development of a country in time of peace and for use in war, if that time should ever arrive, is quite common on the Continent. Thirty years ago I made a good many miles of railway in Italy which had that object in view. They were subsidised railways made with English capital; but there were such terms in the concession that, in time of war, they could be used for purposes connected with that object, namely, the transfer of troops from one point to another. Those lines were what in this country we should call light railways; they were of the same gauge as the main lines; the ordinary main line trucks could run upon the rails, but the rails and the locomotives were light. Wherever a road was conveniently situated on the line of route, that road was used for forming part of the track for the railway. There is no reason whatever why this system, if any new lines are required at all, should not be adopted, rather than introducing into this country, in dealing with extensions of our railways, a system totally different from the lines as they at present exist. I am quite well aware that engineers in this country are often accused of not being inclined to go out of the beaten track. I do not think I can be accused of that, because two or three years ago I was the engineer for what was called the Liverpool to Manchester Electric Express Mono-railway, which was intended to convey passengers at the rate of 110 miles an hour between Liverpool and Manchester. That railway was to be built on a mono-rail system—not upon this system described to-day, on which you could not possibly run at anything approaching that speed; but I should certainly have equally opposed its adoption for the purpose which has been suggested here to-day. In making these remarks it must be understood that they in no possible way affect the importance of the paper and the care with which Admiral Campbell has dealt with his figures; but not being an engineer, he naturally would not have noticed the various engineering points which necessarily occurred to me when I came to read the paper.

Captain G. LUBBOCK, R.E. :—I should like to make one remark on the question of the supposed economy of the mono-rail system, because the advocates of this mono-rail system say it is economical. If you extend our railways and adopt the ordinary broad gauge system, looked at simply from a strategical point of view, and disregarding their commercial value, you simply have to build the line; you do not have to provide any rolling stock or engines, because the rolling stock available on the companies' lines is amply sufficient to carry out any troop move, even the very largest; whereas if you adopt a totally different system, like that described by the lecturer, you have to invest an enormous amount of capital in separate rolling stock. The saving in the building of this mono-rail system of railways has been estimated in the paper at £300 a mile. Even if the saving is as large as that, I do not think it would go very far towards covering the enormous amount of capital that you would have to invest in this kind of rolling stock, which looks to me as if it would be a rather expensive type; that is to say, compared with a corresponding carrying capacity of the ordinary gauge railway, it would cost rather more than the simpler two-wheel vehicles on those railways. If that is so, it seems to me there is very little to be said on the ground of economy. The previous

speaker has anticipated what I intended to say with regard to the break of gauge. I have had some experience of troop movements both in India and South Africa, and I know from experience what an absolutely fatal obstacle that would be. With regard to the question of economy, in view of the enormous amount which would have to be invested in rolling stock of this special type, I think, to say the least of it, it will be exceedingly doubtful.

Colonel G. H. Sim, C.B., R.E.:—I wish to make a few remarks, first as to the strategical aspect of the subject of the lecture. The suggestion of a railway running all round the coast can hardly be recommended as a strategical matter. Railways have been proposed before along the coast for tactical purposes, such as for carrying guns into position; but we should remember, in the history of the 1870 war between France and Germany, that one of the reasons for failure in the French concentration was the fact that their railways in those days, instead of being of a fan-like character, leading towards the frontier, were more or less parallel to it. The sea is the frontier to our island; a small raiding force overstepping that frontier at any point would cut such a frontier line and render it useless for concentration. We have networks of railways actually in existence which will suffice for concentration of the new Territorial Forces on any point, and by which their concentration points can be changed very rapidly. They will facilitate subsequent strategical movements to different points on the coast better than a railway running along the coast-line. If we look abroad we do not see other nations careful to put strategical railways round their coast-lines, I do not think France or Germany have any, and it does not commend itself as a good form of strategical communication. We have to bear in mind that the present Territorial system will tend to dispersion of mobilisation points, rather than immediate assemblage of very large forces, and that our existing railways will facilitate concentration at places where it may be necessary. If an enemy does effect a landing in this country, our object is not defence, but offence; we must go for him. If we can concentrate on any point that is suitable to us, we are not bound to go and fight the enemy at the place he chooses. If you hurry and scurry a few men to the frontier, the probability is they will not be so judiciously disposed as if you take more time for concentration and movement to an advantageous point. I think we may put the underground tube mentioned by the lecturer out of court, because in a railway a tunnel is a most vulnerable part; a small charge of explosive will block it, and it is very difficult to clear it again. The tube suggested is nothing but a long tunnel; it could be blocked at any point by some ill-disposed person, and the whole system rendered useless. Again, in a tube, though the enemy's guns cannot reach you, yet your entraining and detraining can only take place at a few points; on a surface railway this can be done anywhere. With regard to this mono-rail system proposed, I should like to suggest that this is not a real mono-rail at all; it is a tri-rail. There is a central driving rail and there are two pavement rails, one on each side, on which the outside wheels run. It has all the disadvantages of a double rail system in requiring a levelled permanent way. I noticed, also, that in going round this by no means sharp curve at a slow rate, the want of super-elevation was very apparent. I should be afraid the car might upset at a curve; but that is a matter of detail, which the inventor may be able to overcome. A mono-rail has essentially only one rail, and the great advantage of such a system is that you require no cross levelling of the track; the rail is just put down and no work is required at the sides.

Major D. H. RIDOUT, R.E. (Officer Commanding Railway Companies, R.E.):—It has been pointed out by previous speakers that the mono-rail system is not adapted to the kind of work we have to consider; and, neglecting the mechanical features of it entirely, and looking at the map, it strikes me that the system of a railway round a perimeter is of an unsound order. The places of concentration in England have already been chosen and have been worked out at great cost. In time of war, troops will be gathered at those places, for reasons which are apparent to all people who are connected with military matters. It strikes me that we could get troops to any part of the coast, except, perhaps, the north of Scotland, very much quicker by the fan-like arrangement of rails we see, and take the advantage of travelling over more than one line of railway, than by using a railway running round the coast. That coast-line of railway pre-supposes that the concentration has been already made at some point on the coast, and I think that would be entirely unlikely. The field army would not be on the coast, but the coast-defence troops would be; and those troops would not be moved here, there, and everywhere. A railway round the coast would also be liable to be cut; a small force in, for instance, a pinnace, could go and destroy the railway with the greatest of ease. Six hundred pounds of dynamite or gun-cotton would completely demolish 18 or 20 miles of railway, and the time taken to repair it would be so great that the concentration at any point would be lengthened tremendously. I can see no advantage whatsoever in a system of railway running round the coast.

Mr. H. W. P. SKINNER, C.E., M.P.V.C.:—I should like to make a few remarks in regard to the scheme itself, which I do not think has been quite understood. It has been said by one of the speakers that this is not a mono-rail. That is not the case—it is a mono-rail. It is not a one-wheel railway but a three-wheel railway; but it is a one-rail railway. It was never intended that the other two wheels, which are merely balance wheels, should run on rails; they are simply more or less wheels to balance any irregularity that may occur through a badly preserved platform or holes or obstacles lying on it. The pressure on the wheels is exceedingly light. I have made experiments with the cars on a large scale at Louvain, and I found that, after the cars were loaded with about two tons weight, not equally on both sides, but two tons on one side, the other side being empty, and with the track strewn with sand, there was an impression of not more than about half an inch. That shows how very little pressure there is on the wheels. The carriage is beautifully balanced in itself, and it is only for the purpose of giving it more stability that the side wheels have been added. I have busied myself with this question—not, of course, the question of coast defence—but of introducing this system in foreign countries. We have introduced it in South America, where we have now a scheme on hand for building 250 miles of railway, where the Government is going to adopt this system. I have a further scheme for about 100 miles of railway in Syria, where the Government is also going to adopt this system. Whether this system will do so well for the purpose Sir Charles Campbell has in view—that of a perimetrical line— I cannot discuss. It will do splendidly as a feeder for the purpose of bringing traffic to the main lines, because the cost of construction and maintenance is very considerably less than on any other line. If you compare the cost of making an ordinary light railway with the cost of making a railway on this system, you will find a considerable advantage in adopting this mono-rail system. One of the speakers said

he would be afraid to go into one of the cars. I am also very fond of my life, and yet I went in. We went round curves of six metre radius at Louvain; we travelled round it for about 20 kilometres, and it ran so beautifully smoothly that I really did not know I was going round a curve. I was the first gentleman to go on the car, and then several other gentlemen also endangered their lives by making the trip! They are alive yet! Two of the gentlemen are sitting here with me to-day. Unfortunately this trial line has been taken up, so that it is impossible to make further experiments on it; but I made very careful notes at the time, and I can assure you that in practice this system answers first class. It is a great pity that the trial line has been taken up, because, as Sir Charles Campbell said, models never do work properly when you want them to. The model I have seen at Brussels works beautifully, but the model exhibited to-day, for what reason I do not know, will not work properly. The line at Louvain, however, worked exceedingly well. The cars were tried not only by myself but many Belgian engineers, and they came to absolutely the same conclusion as myself; in fact, we might almost have copied our reports, so closely did they coincide with each other as to the results of the trials. I can only say that if a mile of this line can be constructed you would be surprised how beautifully the system works. I have no personal interest whatever in this system; I am not connected with it in money matters. The only interest I have in it is that I am using this system for many railways which I hope to carry out in a very short time. That is the reason I recommend the system to your close consideration, and ask you not to simply judge it by a model which can only be put down as a toy.

Vice-Admiral Sir CHARLES CAMPBELL, in reply, said:—I am very much obliged to you for attending here to-day, and I am delighted to find so little has been said against the paper. I was very pleased indeed to hear what Mr. Elliott-Cooper said, because I have always been found fault with in this Institution for going too far ahead. I was ridiculed in this Institution twenty-five years ago when I stated that yards and sails were sinful. Is there a yard or a sail on any ship now, and is there a man who would dare to stand up and say there ought to be? Objections were made also when I spoke at the same time about the turbine as a possible engine for future battle-ships. The turbine has come and has had its day; and there are those now who doubt the certainty of the general adoption of internal combustion engines for the big ships of the Navy and Mercantile Marine. It will come, nevertheless; and that in its turn will give place to aerial transport and other great ideas as yet unborn in the minds of men. It has been reserved for me to-day to have the real treat of being told by Mr. Elliott Cooper that I have mentioned something that was already in existence. I am extremely glad to hear it, and I really hope that the Board he mentioned as being now in existence will continue to be of service to the country on the points I have suggested for discussion to-day. The Board I advocate is more on the lines of the "Light Railway Commission," for the purpose of creating new extensions, in addition to organising existing means of transport. Colonel Hamilton Sim was good enough to mention the question of concentration on the coast. Of course, I could not go to-day into the whole question of concentration like a War Office Committee or Commission, which would have months to formulate it. I simply made that rough sketch out of the A B C Guide, and put it forward to show you what was in my mind for getting the troops to the threatened area at short notice. One map on the wall shows concentration by radiation from

centres; the other map shows change of danger spot. It is all very well for you to say you can concentrate here or there, but your friend who is going to attack you in his ships is a moving power, and I maintain, with all due deference, that it would not be a bad thing—I do not want to assert that I know more than anybody else about it—to be able to convey your troops from one place to the other place where the enemy has shifted himself to. Therefore I think that if anybody was considering this scheme as it ought to be considered, that would be a point on which they must legislate. It seems to me to be extremely necessary that we should be able to get along the coast as well as concentrate by radiation. It is a little different to a frontier coast of hills, because with such a frontier your enemy can only come through ravines and such places where he has less difficulty in getting over; whereas your sea enemy can move about to any part of the coast and jump on you where you least expect it," as I have explained. With regard to the change from the existing double rail to the isopede system, no transhipment would be required. The isopede can run on both tracks; all the engines and carriages could easily be constructed with a mechanical contrivance to raise the driving centre wheel so as to allow the side wheels to run on the double track. On reaching the spot for the change, the driving wheel could be lowered to the running slot and the train with troops, guns, and equipment, etc., would proceed to its destination. I am quite accustomed to the blowing-up business that has been mentioned in the discussion. That can be said of any scheme that is produced or thought of in this world. It does not matter what you do; it can always be blown up; I spent three months continually speaking on the subject of the Channel tube railway, and I was blown up night and day—the critics were always blowing the whole thing up. It does not matter what line of railway it is; it does not matter whether you have one line of railway or three lines of railway; it would be the same. They may all be blown up by the gentleman that is coming round the corner; but in my opinion it is better to have a system and chance its being blown up than not to have any system at all. On my way here a few days ago I met an old friend who asked me if I was going to say anything about the suffragettes at the lecture. I told him I thought I would; and what I wish to say is this, that if there is any lady or woman in the country who can persuade ten men to join the Territorial Army I would give her a vote! I am very much obliged to Admiral Mann for saying a word or two about the paper. He spoke from the point of view of the Blue-water School. I belong to the Blue-water School in this way, that I think the fleet ought to keep the enemy in their ports and never let them come out at all. I am not a "whole-hogger." The "whole-hogger" of the Blue-water School rather talks as if he did not want the national training and defence which we think so advisable. There are even worse people than those who belong to the "whole-hogger" Blue-water School, and they are the people who belong to the Cold-water School—the people who throw cold water on everything that is proposed. I know about them because I have so often heard them speak. I do not belong to that school myself; in fact, if I must make a confession I am rather the other way about—I belong to the Hot-water School, having been in hot water ever since I can remember. I want to prepare against invasion. That is the whole object of my paper, and I intend to devote my brains—what little I have got—to assist in stirring up the country to realise the necessity of training and concentration. I would ask your permission to quote from an able letter that appeared in last Friday's *Morning Post,* which accentuates what I have tried to bring to your

notice to-day, and of which the following is an extract:—"Consider the immediate future. Within six years from to-day the greatest aggressive Empire since Napoleon will have forty mighty battle-ships—half of them *Dreadnoughts*—within a day's steam from English shores, and they will be supported by a cruiser fleet and a torpedo fleet of terrible possibilities. Within another six years that aggressive Empire will have fifty-five great battle-ships—forty of them *Dreadnoughts*—together with an immense torpedo fleet. And behind that mighty fleet will be all the preparations of a War Office ready to throw 250,000 splendid soldiers across the narrow seas." If that is not enough to make a Britisher ponder I do not know what is. In conclusion, I thank you for the honour you have done me in attending and discussing this important question, and I ask you to realise the situation and spread the doctrine of energetic national defence wherever you go. While a powerful and far-seeing monarch was speaking of peace and goodwill at the Guildhall, his Parliament were voting an increase of millions for the fleet. *Facta non verba.* The war clouds are even now gathering above the horizon. The call to arms is written large on the possible programme for the immediate future! Our command of the sea is seriously threatened, and unless the necessary steps to prevent it are taken at once it is doomed; and when we have lost the command of the sea, all that I have endeavoured to advocate to-day will become a thousand times more vitally important It has been truly said: "A sea frontier with the command of the sea is the greatest national safeguard"; but a sea frontier without the command of the sea becomes a national danger. Let us, then, back up (and above all refrain from crying down) those who, in their humble way, are making strenuous efforts to awaken the nation to the strategic development of its gigantic naval and military resources. Let us one and all think only of the safety of the Empire, and let us each pull our pound to create a position of such strength as to ensure that we shall remain the predominant factor in the maintenance of universal peace.

The CHAIRMAN (Sir John Wolfe Barry):—I have few words to offer on the paper which has been so well discussed, but there are one or two ideas that occur to me. One is, that I with heart and soul advocate the aims of the National Service League. I cannot conceive anything so good for the country as the programme of that League, whether we consider their views from the point of view of military matters and the defence of the country, or whether we consider from a social point of view as being the best system which could possibly be evolved for the physical development of our people, and for their training and discipline in the power of individual effort and mutual support. I think sometimes, in looking at one point of view, the other is too little considered. All military and naval men are of one opinion as to the value of the movement from their point of view, and I only wish that civilians could universally see it from the other point of view; that is to say, its great civil advantages of national training. We have to look across the Continent to our great protagonist in commercial matters, Germany, to see the benefits which that nation has derived from universal service for the development of trade, science, and commerce. They are the better fitted for it in every way. If you look to other nations you see the same thing, and from my experience of labour, I can realise the advantage of training which an old soldier or sailor has received from his service under discipline. The development physically of the man is better; the development of his mind is better; the development of his powers is better;

and from all points of view as a civilian he is enormously advantaged by military training; but of course I am assuming it is not carried so far as to interfere with the objects of his civil life. We know that all this training can be done under the programme of the National Service League without impairing the earning power of the man; and from that point of view, not being a soldier, I have taken the widest and deepest interest in the objects of the National Service League. As a civilian I bow to the views of naval and military men, and I know they are absolutely unanimous on the point; but the civilian point of view has been too much neglected, and I am glad to have any opportunity of expressing my views from that point of consideration of the question of universal training. I think there is another matter in the paper on which we are all agreed, and that is, the enormous value of the railway system for the concentration of troops. That cannot be gainsaid, either. Some of us may differ as to the way in which it is desirable that railways should be laid out, whether they ought to be concentric or whether they ought to be radial. As far as I can form a judgment, my verdict would be distinctly towards the radial system and not towards the concentric system. I also realise that the point of concentration in time of war may very likely and probably will not be on the coast. It seems exceedingly difficult to be able to have a movable point of concentration which can be adjusted on the spur of the moment to meet different points on the coast; therefore, I imagine that the points of concentration must be thought out beforehand, and from that point of view the radial system of railways must be the best, as the power of concentration must be much larger under those conditions. Another matter has been brought before us to-day, namely, the mono-rail. Ingenious as this system of mono-rail may be, I cannot believe myself that it is the means by which an army could be quickly concentrated in time of war. Efficient powers of concentration should be based upon a system which will bring the ordinary rolling stock of the country from all points to the point desired with the greatest amount of speed and convenience. Any transhipment, either of *matériel* or troops, ought to be avoided like the plague; and therefore the introduction of any other system of railway for the conveyance of troops and *matériel* ought, in my opinion, to be barred. It so happens that I have been fighting all my life against the question of break of gauge, and it is a great relief to this country that there is no longer a break of gauge in the railway system of England. It was got rid of on the Great Western Railway at great expense, and it will never be restored. So that, from this point of view, I cannot support the views of the lecturer, that the mode of concentration should be by means of the mono-rail. I think we shall all agree that the consideration of the best means of concentration in time of peace for the exigencies of war should be a subject which ought constantly to engage the most careful attention of those best qualified to form an opinion. We cannot doubt that these matters are being investigated, and that a judgment is being formed by those in authority. I have the greatest confidence that that is being done; but if further expert advice is required upon such matters as these, as to whether a series of loop lines should be made in this or any other direction so as to facilitate the going and returning of trains for carrying troops or in organisation, I am quite certain that all the civil divisions of our country would place their services with the greatest possible pleasure at the service of the military staff. I corroborate what Mr. Elliott-Cooper has said as to the existence of a civilian corps for this purpose, and we also know that at the War Office there is an Army Railway Council, so

that the preliminaries are all there for a full and continuous consideration of the subject. It may very well be that more radial lines are wanted; it may be that they ought to be here and there looped up to one another, so that without losing their radial character they might become part of a system accommodating different parts of the coast, and provide for the easy circulation of trains. These are all matters which should be very carefully considered and I have every hope and belief that they will be. I have obtruded my remarks, perhaps, at too great length, but I am happy to be able to say what I have said, and I place my opinions before you for what they are worth. The opportunity of making these remarks also gives me the pleasure of asking you to pass a very hearty vote of thanks to Admiral Sir Charles Campbell for his interesting lecture. I am sure nobody can have heard the paper without feeling how much his heart is in the subject, and we are all grateful to him for having brought this subject under our notice, as it has been the means of evoking a valuable discussion.

# REFLECTIONS ON THE TACTICS OF THE ATTACK.[1]

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THE object of war is to defeat the enemy, and so force him to agree to the terms of the victor. As no battle can ever be won by merely defensive action, and no campaign can be really satisfactorily brought to an end by merely preventing the enemy winning—to terminate a war successfully an offensive *rôle* must sooner or later be adopted, naturally culminating in the tactical attack on the battle-field.

In the same way as the handling of troops is divided into strategy and tactics, or the giving of the original impulse to the movements of armies and the handling of those armies when in contact with the enemy, tactics may be divided into grand and minor tactics; by which terms I mean the setting in motion of the larger bodies (after contact has been established) to carry out the plans of the commander, and the handling of the various components of those units when actually under fire.

Battles are fought, not by machines, but by men, consequently the human element plays an all important part in war. It is thus most important before discussing the tactical attack and the best means of planning it, and the best formations for carrying it out, to consider the human element, and to form some ideas as to what losses troops may be expected to bear without refusing to go on. Theoretically, troops, well trained and well disciplined, should always advance if told to, but practically we know a time comes when the best troops in the world will not respond, and will refuse to advance; this time comes sooner or later, according as the discipline and *moral* is bad or good, as the commander has not the confidence of the men or the reverse, as the cause of the war is not popular or the contrary, etc., but sooner or later the psychological moment arrives.

In considering this question it is necessary to insist upon the fact (fully proved by the war in Manchuria) that modern battles, owing to the improvement in arms, which cause losses at much greater distances than formerly, will last for days. This fact causes a much severer strain on the troops engaged, who suffer losses at much greater distances, and spread over a much longer time than in former days.

Added to this, we must not lose sight of the fact that the spread of education, and the improvements in the conditions of

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[1]This article was written in November, 1907, but was not forwarded for publication until some months later.

life in Western European countries and America, have made life much more worth living, and consequently there is a corresponding desire to avoid losing it; it would, therefore, hardly be wise to accept the losses, often borne unflinchingly by the Japanese when attacking, as a standard of what Western European troops will face.

In no European nation is there the same veneration for the departed, which veneration may be said to be part and parcel of the Japanese religion; nowhere is there the same almost fanatical loyalty to the sovereign, united with the most intense patriotism, as is the case in Japan, and it is these factors which have inculcated a contempt for death, and readiness to meet it, which no Western nation can hope to emulate. We have seen not once, but repeatedly, troops driven back with 30 and 40 per cent. losses being re-formed and led again and again to a final successful assault over ground strewn with the bodies of their dead and dying comrades.

It is therefore most important that a commander should carefully consider what losses he may expect his men to face, before refusing to advance, and not to ask them to undertake operations which are likely to rise above this maximum, otherwise he will only be courting disaster. In this connection it may not be out of place to insist that British commanders, owing to the strictly limited supply of trained material available, must also consider this question from another point of view, namely, can they undertake operations entailing heavy losses.

In the past we have had what is called the defensive-offensive deliberately adopted by commanders whose troops were just as numerous, and just as well disciplined, trained and equipped, as those of the enemy. The success of this system depends upon an absolutely correct appreciation of the situation and the possibility of being able to immediately direct all large tactical units along the whole front of battle; under modern conditions, however, where the front of the troops engaged extends for many miles, such a state of affairs is no longer possible, and a commander adopting such an attitude might find himself beaten in detail though actually having larger numbers than his adversary; such was practically always the case with the Russians in Manchuria. Though the spirit of the training of the Russian Army was offensive, and though there were always reserves kept in hand for counter-strokes, they were never employed for this purpose, as they were never available where required, but spent their time aimlessly marching and counter-marching, and generally only came into action to cover the retreat of the army, largely owing to the incorrect appreciation of the situation by the Russian commanders, and to their inability (thanks to the enormous extent of front), to control the action of these reserves at the critical moment.

A study of the battle-fields of, say, Waterloo and Gravelotte, will illustrate my meaning, and yet the front occupied at Gravelotte was as nothing to that occupied at Liao-yang, and even less

in comparison with that at Mukden. At Waterloo the small extent of the front enabled Wellington to be in touch with his whole line and to personally follow the fortune of the battle along the whole front, whereas at Gravelotte it was impossible for Moltke to know what was going on beyond his immediate neighbourhood, and he had to depend upon the messages sent in by the various commanders to know how the fight went elsewhere, and from the nature of things, due to considerations of time and space, the conditions might have, and had, materially altered before he received the messages in question.

In modern war a commander cannot control the action of a single Army Corps by personal observation, and must be dependent upon the information received from his subordinates. It is true that modern commanders possess telephones, telegraphs, and visual signalling, which enable them to keep in touch with their subordinates, but the failure of a single link may upset all calculations, and even with these appliances, by the time important news has passed through the different transmitting authorities, the original conditions may have materially altered.

Thus modern conditions due to the enormous extent of the battlefields of to-day render the personal observation of the battlefield, so necessary for a defensive-offensive action, an impossibility, and consequently it is improbable that a commander will adopt such a *rôle* if he is in any way on an equality with his adversary.

The initiative is the key of success whether in strategy or tactics, and this is so universally recognised that we may expect to find all commanders endeavouring to assume the offensive, and one would therefore imagine that all modern battles would partake of the nature of encounter battles, and that both sides would simultaneously attack.

This may appear to be the natural result of modern conditions, but practically it will seldom be the case, for a multitude of reasons, real inferiority, backwardness in mobilisation, defective initial strategy, and, above all, the human element (a weak and vacillating man opposed to a strong determined one) will cause one side to assume the defensive, the other the offensive; nothing is easier than when in doubt to take up a position, assume the defensive and satisfy one's better military feelings by promising one's-self to take the offensive later on. The initiative is, however, seldom regained, especially when voluntarily given up.

Although it will probably be the exception, a short consideration of the encounter battle may not be out of place.

Let us assume, then, that the two opposing armies, each bent on the offensive, are in actual contact with their advanced guards. Though contact has been established, and both sides are attacking, the fog of war will be particularly thick, and the Generals in Chief, who, from the practice of modern war are some distance in rear, will have only a very vague idea of what is happening, added to this, assuming several Army Corps on

either side, the front of contact will be wide and the various reports coming in will be most conflicting.

In such a state of affairs the commander who first makes up his mind and energetically carries out his plans is morally certain to win, as he will have thrown a preponderating force on some given point and pushed home his attack before his adversary has really learnt where the blow is coming. To rapidly come to a decision and to rapidly carry it out requires good information and good means of communication, for good intelligence is useless unless it can be speedily communicated to the supreme commander, and quick and sound decisions are of little use if the orders to give effect to them cannot be readily communicated to the subordinate commanders who have to carry them out.

We thus see that other things being equal, the commander who gets the best information will make the best decision, and that to make a speedy decision the information must reach him quickly; consequently the first and most important elements of success, other things being equal, are good and quick reconnaissance and good and rapid means of communication. Thus a successful attack in an encounter battle, other things being equal, depends more on reconnaissance and telephones, telegraphs or visual signalling than on tactics as the term is generally understood. Success therefore in such an encounter as we have been considering, though the consideration is little more than academic, depends largely upon intelligence and communication, which, if good, will make up for many other deficiencies, and place a numerically inferior army on an equality or even make it superior to a much larger hostile force, in which the intelligence, reconnaissance, and communication services are inferior.

In reality, however, in ninety-nine cases out of a hundred, no matter what the original ideas of the respective commanders may have been, one will take up a position.

Positions may either be carefully prepared or merely strengthened by rapid field fortifications.

If the defence has been decided upon from the outset we may expect to find the selected position so fortified as to be in reality a field fortress; if this is the case and strategical reasons demand its capture, progress will be slow and will approximate to the gradual approach to a real fortress requiring most careful reconnaissance and preparation, such an attack is outside the scope of this paper, being in reality fortress and not field warfare.

For the purposes of this paper let us assume that the adversary, for what reason is immaterial, has decided on defensive action and has taken up and hastily fortified a position to bar our forward advance. We may try and manœuvre him out of it, but by so doing we shall not gain a tactical success, and whilst the hostile main army remains undefeated we cannot hope to bring the campaign to a successful close, we must therefore harden our hearts and attack him in order to defeat him. Before

considering the tactics to be employed it may be as well to try and see what the enemy's line of action will be.

Owing to improvements in arms the tendency of modern tactics is to extension and consequently a position can be held with many fewer men than formerly, thus one of two things will happen, the position will be much more extensive, or the enemy will keep many more men in reserve for counter-strokes, by which alone an army on the defensive can hope to gain a tactical success. In reality, however, we may expect to find a combination of the two. Owing to this greater extension and consequent increase in the size of positions, it may very well happen that reserves are too far away from the decisive point to influence the issue, or if they are too much split up they will be too weak to successfully fulfil their *rôle*. Thus we may expect to find the defender adopting every possible means to find out as early as possible where the real blow is coming and the attacker must be equally solicitous to conceal the point of his real and decisive attack. The defender may therefore be expected to form a series of false fronts to deceive the attacker and thus endeavour to make him disclose the direction of his main attack.

It appears therefore that we may expect the attack of a position to consist of three stages, the approach, the preparation, and the assault. The approach will consist of driving in the false fronts and the location of the real position; the preparation of the reconnaissance of the real position, and the framing of the commander's plans for its attack; the assault of the carrying out of these plans in the tactical attack on the position.

Having arrived thus far we can now proceed to consider each of these stages in detail.

## The Approach.

Whatever may have led up to it, the situation will be that the advanced cavalry has been checked and cannot get on; and beyond the fact that there are infantry and guns in front nothing further can be ascertained. This information has been sent to the General-in-Chief some considerable distance behind, and the cavalry leaving small bodies in contact along the front has drawn away to the flanks, to try and gain as much information as possible regarding the hostile position.

At this stage the cavalry requires careful handling as the situation is not clear and the Commander-in-Chief requires early information as to what is in his immediate front, whether it is a false front or the hostile army in position.

The cavalry leader must be enterprising and energetic, otherwise he may find himself with the bulk of his mounted men opposing only a small force of the hostile cavalry, whilst its main body is active on the other flank, pushing back the weaker mounted troops opposed to it, endeavouring to find out what is going on behind, and harassing the advancing columns.

Should such a situation arise the inferior cavalry must make the fullest use of dismounted action in order to keep back the superior cavalry until the arrival of reinforcements, cavalry or infantry, enables it to regain its freedom of movement.

The *rôle* of the cavalry is therefore clear in this phase, viz., reconnaissance, but it must be prepared to make the fullest use of dismounted fire action to prevent the hostile mounted troops driving it back, and so hinder and inconvenience the advancing columns it is covering.

On receipt of information that hostile troops are in position in front the General-in-Chief will direct his advanced troops to drive them in, and close up his main bodies to well within supporting distance. He must, however, not deploy too many men, or show his hand at this initial stage, but should keep as large bodies as possible in hand so that he may be able to move them to the spot against which his main effort will be made in the actual assault.

The advanced troops, however, must attack vigorously, for the amount of resistance met with will soon show whether it is only a false front or the hostile army in position that has to be dealt with. Should it turn out to be the hostile army in position, the action to be taken is that described under The Preparation, (see later), but if it appears that it is only a false front it must be driven in as rapidly as possible, for the longer the adversary is unmolested on his position the more spade work he will do, and consequently the stronger his position is likely to become.

Let us assume it is a false front to be dealt with. In such a case the defence will only employ a few troops to hold this line, and will be really fighting a delaying action of the nature of a rear-guard one; the minor tactics of this phase may and should be bold, extensions may be wider, reserves may be dispensed with, and the artillery should move right up in support of the infantry attack. As time is so important in the state of affairs we are considering the commander must trust to his cavalry to have correctly gauged the situation and attack boldly, and take risks which would be unwise did he suspect anything in front of him beyond a false front or screen; the closing up of the main bodies, if communication is carefully maintained, will be a precaution against defeat in detail should he have been mistaken and the screen turn out to be the position. Should this turn out to be the case it will soon be manifest, for the attacking troops will be quickly checked, but they should at all costs strive to maintain their ground, for which purpose the spade must be brought into action as well as the rifle. It the troops are not themselves carrying an entrenching tool, they will be at a great disadvantage, as it will be found next to impossible to bring up the wagons carrying the tools.

Should all go well and the screen be driven in, the line occupied should be at once entrenched, so that the main bodies in rear may be safe to march unmolested to the places which will be assigned to them, under cover of the advanced troops. The

entrenching tools are immediately required whatever happens, and unless the men have them on their persons it is doubtful whether they will ever get them.

In the attack of the false front, artillery, though most useful, does not appear to be so vitally necessary as in the final assault. The enemy will not have many guns available; his force will be small, and the position will presumably be neither heavily fortified nor obstinately held. If a large force of artillery is employed, the guns once committed to action will be hard to collect again for the massed fire which will be required for the assault. It appears, therefore, that the troops detailed for the attack should be at once deployed and pushed on boldly, with practically no reserves kept back, but all parts of the line mutually assisting one another, the guns closely supporting the infantry and using direct preferably to indirect laying. It, of course, goes without saying that every possible advantage of ground should be taken, and every endeavour made to bring enfilade and converging fire to bear on the defence.

The main characteristics of this phase are, therefore, intelligence, communication, boldness, absence of elaborate reconnaissance and preparation, and last but not least, entrenching tools immediately available to put the ground captured into a state of defence. If the attack has been well handled and has been ordinarily fortunate, we may expect to find the false front driven in the first day; the earlier this has taken place the better, but we will assume that the attack has definitely occupied the front lately held by the defence by sundown.

During the day a certain amount of information has been gained as to the position of the enemy, and during the night orders are issued for the further advance next day, when the second stage or preparation for the assault will commence.

## The Preparation.

By night the troops proceed with the entrenching, and making good the line won during the day; work should not be stopped or the troops allowed to rest until a strong defensive line has been created; this is absolutely necessary in order that no counter-attack of the enemy may drive back the advanced troops and so interfere with and disturb the main bodies in rear. It follows, as a matter of course, that patrols are sent out towards the enemy and all suitable measures for security taken, and that all men not digging or on outpost duty are allowed to get what rest and sleep they can. Side by side with these tactical operations there is much administrative work to be done; units mixed up have to be sorted out and reorganised, ammunition to be replenished, rations to be distributed, wounded collected and sent to the rear, the orders for the next day to be written and issued, all requiring much time and care, and none of which can be omitted.

The preliminary fighting which I have designated "The Approach," has led to the conclusion that the adversary has

decided on defensive action, and consequently has surrendered the initiative. If there is any force in the argument advanced against defensive-offensive action being deliberately adopted in preference to offensive action, the assumption of the defence implies inferiority. The attacker therefore starts with two great advantages: the initiative and a feeling of superiority, which combined justify him in taking risks in the stage of the action which will now be considered.

Before proceeding further we must consider the formation of the troops holding the defensive position. The tendency of modern tactics is to extension, to avoid losses (as no troops can live in close formations under modern fire properly directed), and to obtain the greatest effect from the modern rifle, which can only be done if every man under fire can use his weapon. We might therefore expect the extent of front occupied to be limited only by the number of men available, allowing one man per yard, with small reserves to replace casualties, which reserves, it may be observed, should be close enough up to take the place of casualties without exposing themselves, being at the same time under cover, so as to avoid losses when not actually firing. As, however, a battle cannot be won by merely preventing the enemy winning, arrangements must be made for offensive action in the shape of counter-strokes, for which large reserves must be available. The actual front occupied, therefore, must allow for these reserves. But the front must be sufficiently extensive to compel the attacker to extend over a wide front in order to have some chance of launching a counter-stroke at some weak spot in the attack. Thus we see that the position must be extended in order to force the attack to extend, and must be so occupied that reserves of sufficient strength are available to make really powerful counter-strokes. If the defence is too thick, fire effect is lost; the attack is not forced to extend and can envelop both flanks and surround the defence, which in such an extreme case of over-concentration would have no space in which to manœuvre its reserves, and they would be exposed in close formations to the full effect of modern fire.

With the large forces we are by assumption dealing with, the extent of front occupied will be very extended, and consequently the large reserves will be widely separated (for if there are reserves everywhere they must of necessity be weak, and only sufficiently strong to make local counter-strokes), and if the attack is energetically handled, when the point for the final assault has been decided on, there will not be time to collect them for the decisive counter-stroke, which cannot be advantageously delivered until the situation has finally developed.

The attacker must endeavour to find out the weak and strong points of the position, and if possible locate the reserves and main gun positions before making any decisive attack; this can only be done by reconnaissance, and as such reconnaissance, to be of real use, must force the defence to disclose its positions, it will entail fighting all along the line.

This fighting must consist of simultaneous attacks all along the front, otherwise no really useful deductions can be made, and it is these attacks I have named "The Preparation," and are what I propose now to consider.

As so much depends upon the proper preparation of the assault (in fact, it appears not too much to say that success or failure is assured at this stage), I propose, at the risk of being tedious, to consider, in detail, the preparatory phase which appears to be the considering stage as opposed to the daring stage, so aptly described in the German saying: "First consider, then dare."

It is generally recognised that a modern battle, due to the improvement in arms, use of the spade, etc., lasts more than one day, and is a step-by-step process, each piece of ground gained being used as a fresh starting point or a point from which to cover the advance of neighbouring bodies of troops with fire. In this step-by-step advance one great and important point must ever be borne in mind, and that is, never give the enemy any rest, as, if not engaged in fighting, he will be digging, and every hour of spade work will increase the difficulties of the attack.

In the preparatory stage, which is really a reconnaissance in force or attack all along the line (from which, however, there must be no going back, and all ground gained must be held at all costs), the attacker can operate with many fewer men than one might expect; for the defender, not knowing where the main attack is being made, and consequently where the main masses are collected, will hesitate to commit his reserve to strong counter-strokes until the situation has sufficiently developed to enable these points to be determined with some certainty. Until these points are cleared up, a strong counter-stroke may be wasted by being launched against a portion of the attacking line, the defeat of which will have no influence on its commander's plans, or may stumble against such strength as will of necessity entail its defeat. Such considerations justify a general taking risks at this stage which in other circumstances would be most unwise.

For these reasons, therefore, the idea of having a large force of artillery with the advanced guard and immediately putting in a large mass of guns and thus forming a great central battery on which as on a framework the battle is built up, does not seem sound; if a large mass of guns is employed at an early stage their position is known and the defence will take steps to prevent any success attending a general assault in this portion of the line, and being already committed they will not be available to open an unexpected and overwhelming fire on the portion of the position selected for attack, as soon as the infantry advance to the assault. For this reason it would appear better to keep back the main masses of the artillery until the actual portion of the position to be assaulted has been decided upon.

The General-in-Chief has presumably framed his plan of attack in outline before the actual approach, by the end of the approach stage the information received from the front has probably cleared up some doubtful points and he has no doubt decided where approximately he will make his main attack and where approximately he will feint.

The general lines have, we may therefore assume, been settled, and the preparation will enable the "how" the attack is to be carried out to be finally decided.

The orders for the second day can, however, be only general, each of the larger units will be given a certain section of front, those units making the secondary attacks the largest, those the feints somewhat less, and those selected for the main attack the smallest frontage of all.

In these orders certain troops will be detailed as a general reserve (or reserves if the line is very extended) in the hands of the G.O.C.-in-Chief, and the general commanding the Army Corps which is to make the main assault will probably receive instructions to hold back the greater part of his force.

The orders to the above effect will be issued the night of the occupation of the enemy's false front, and instructions will no doubt be issued to each of the corps commanders explaining the G.O.C.-in-Chief's plans more in detail.

The orders for the preparation can only be very general, as nothing very much regarding the enemy's real position can have been found out during the approach; in fact, it is quite possible that the cavalry have not really located the flanks. This will all be found out during the preparatory stage, when the cavalry can be helped by aerial observation; too much reliance must not, however, be placed on such observation, as though folds of the ground can be seen into, if the country is at all wooded, observation will be much impeded, if not altogether prevented.

It is impossible to talk of infantry, cavalry or artillery tactics, as such, for there is no such thing as infantry, etc., tactics. Tactics are the combined action of the three arms, so it will be impossible to consider them apart. It will, however, possibly be correct to deal with the action of the independent cavalry separately from that of the large mixed bodies of troops such as Army Corps, for though they all work in harmony still there is not that intimate connection between the independent cavalry and the Army Corps as there is between the components of Army Corps or divisions.

We can now proceed to consider in detail the action of the independent cavalry and of the corps or divisions which the Commander-in-Chief has for his line of battle. As a correct knowledge of the extent of the enemy's position is necessary to enable the Commander-in-Chief to make adequate plans to capture it, the independent cavalry working on the flanks must make quite certain that they are correctly located, and the observations made in the air must be carefully checked by the reports from the cavalry.

The mounted troops of the attack, working wide on the flanks will without a doubt encounter those of the defence, and a conflict will ensue, it is quite possible and very probable that the defending cavalry will, if the ground is at all suitable, be able to stop that of the attack, for with rifle and horse artillery fire, cavalry have a defensive power nowadays which is possibly sometimes not sufficiently appreciated. For this reason it is more than possible that the enemy's horse will stop ours from advancing and that there will be considerable delay and possible stalemate so far as the rival horsemen are concerned. Yet the flanks of the hostile position must be located before the G.O.C.-in-Chief can frame his plans, and this must be the duty of the cavalry, which has been in touch longer with the adversary and has opportunities of working wide to the flanks not possessed by the slower moving infantry; as soon as the flanks have been approximately fixed, and the commander has issued his orders, the independent cavalry must take up the *rôle* of screening the movements of its own troops.

The minor tactics of the mounted troops on the flanks are therefore both reconnaissance and screening, primarily the latter, for it is of the most vital importance to keep the defence from knowing what the attack is doing. The independent cavalry will, therefore, have much defensive work to do, and the greatest advantage must be taken of fire effect to fulfil this *rôle*. In this connection it will be necessary to take special precautions to stop officers' patrols getting through the defensive line. During the preparation, however, the cavalry leaders must not hesitate to attack if opportunity offers, for by so doing the impression that the real attack has commenced will be heightened and the mystification of the enemy increased. With this end in view the more advantage that is taken of the defensive power of cavalry due to the fire effect of the magazine rifle, the more men will be available for mounted work and shock action, which is the only really satisfactory offensive action cavalry are capable of. Whatever action of this nature may be undertaken, the cavalry leader must bear in mind that once the supreme commander has issued his attack orders his major *rôle* is to conceal the movements of his own troops, and thus keep the defence in ignorance of what is going on as long as possible.

Having briefly sketched out the tactics of the independent cavalry on the flanks, let us now consider the action of the troops comprising what, for want of a better term, I will call the line of battle troops. A few remarks as to the position of the supreme commander on the battlefield may not be out of place. The position selected by the General-in-Chief as the site of his headquarters on the battlefield, being the nerve centre, so to speak, of the whole army, must be well known and easily found by all subordinate leaders, as any change of the position of the G.O.C.-in-Chief will upset the whole communication arrangement of the battle-field, telegraphs, telephones, signal stations, etc. Success, as we have already shown, depends not only on accurate infor-

mation, but on the rapid receipt of this information by the supreme commander. Thus anything which delays the rapid forwarding of information tends to promote failure; it is therefore of vital importance that the position of the supreme commander should remain unaltered till the battle is lost or won, and must therefore be so far removed from the fighting line that all thought of danger may be put on one side, and the commander and his staff may devote all their time and energy to the consideration of the problem before them. There should be telegraphic certainly, and if possible telephonic communication also, between the G.O.C.-in-Chief and his corps commanders, or whatever the group commanders may be called with whom he deals; the former for all messages, orders, etc., the latter for personal conversation between the general and his subordinates. This is, however, ideal, and in practice one of these means of communication will have to suffice. *En passant* it may not be out of place to insist that it is the duty of the staff to withhold all harrowing details from their chief, such, for example as the number of casualties sustained in an unsuccessful attack; the G.O.C.-in-Chief has to think and accept all responsibility, and it is quite unnecessary to add to the load he has to bear by informing him that he has lost 10,000 men,; it will be quite sufficient to tell him that an attack has failed, time enough to give full details when the issue has been finally decided.

The major tactics of the preparation would appear to consist of attacks all along the line with widely extended troops who are apparently bent on pushing home, but who are really only drawing the enemy's fire and making good certain natural features as *points d'appui*, with considerable reserves held back especially strong in guns in rear of that portion of the line which it is thought will make the main attack when the assault is ordered. Under cover of this simulated general attack, careful reconnaissance of the position is being carried out, lines of approach are being noted, artillery officers are selecting gun positions and taking ranges with a view to the main assault when ordered.

During this stage it is much more important to stop the enemy seeing what we are doing than to find out what he is doing; the attack having the initiative, the defender is not likely to strike out any new line for himself, and consequently is not likely to be moving troops about on the position.

As some *data* must be assumed, we will consider that the enemy, slightly inferior in numbers to ourselves, has roughly fortified a position several miles in extent—the actual extent does not much matter—and that we are attacking with an army of a certain number of divisions—the number for our purpose does not very much matter. We will naturally consider divisions constituted as British divisions now are, *i.e.*, 3 brigades of field artillery, 2 batteries of howitzers, 1 of heavy artillery, 3 brigades of infantry, 2 companies of mounted infantry, 2 field companies, and the usual auxiliary services, telegraph, supply and transport companies and field ambulances.

At the stage we have arrived at, the General Officer Commanding-in-Chief can only have made very general plans based on the general strategical position, for he knows next to nothing about the position of the enemy, its strong or weak points, and indeed he will have been exceedingly well served by his cavalry if the true flanks have been accurately fixed.

We have assumed that the general plan of action on which the orders for the preparatory action are framed will be an attack all along the line with the object of keeping the enemy engaged all along his front, and so mystify and mislead him as to where the real attack is coming; to heighten his mystification, a feint against one flank will probably be resorted to, whereas the real attack is planned to take place against the other. The flank which the Commander-in-Chief intends to attack can at this stage only be fixed by strategical considerations, and with this object in view he will keep back his, as opposed to his subordinates' reserves, in the neighbourhood of that flank. As the fight progresses the plans may be altered, as it may be found more feasible to pierce the centre than to drive in a flank. All that can be said at this stage is that the front will be divided up amongst divisions and as large reserves as possible held back, massed near the flanks, the largest reserve near that flank which for strategical reasons appears to be the one against which the main effort should be made.

This plan of keeping general reserves near the flanks may appear dangerous, but risks must be taken. The enemy has probably stationed his reserves on the flanks too, and if the forces engaged are not very large, the defensive power of modern arms is so great that even if the defender issues from his position and attempts a counter-stroke against any part of the attacking line, that part with its local reserves should be able to maintain its position until the C.-in-C. can send reinforcements. On the other hand, if the forces are very large they will have been divided into armies or Army Corps, and each group commander will have his reserves wherewith to meet any such counter-stroke, and assuming inferiority in numbers on the side of the defender, if he issues out to pierce the centre of the attack, his vital flank may be turned, and his line rolled up, whilst he is endeavouring to overcome the resistance of the hostile centre by assumption now acting on the defensive.

It seems to be very doubtful whether any commander attacking with an army composed of several divisions would have his heavy artillery distributed one battery per division, and it appears more probable that he would group them into brigades of two or three batteries. These guns are so powerful and long ranging that it appears doubtful policy to leave them in the hands of subordinates, they should be at the disposal of the C.-in-C. in the case of small armies, or in the hands of the Army Corps commanders in the case of large ones.

The orders issued for the preparatory stage as already mentioned can only be very general, and beyond assigning certain

fronts to each division, army corps, or army (with instructions to attack to their front within those limits), are not likely to contain anything very definite.

For the purpose of this paper I propose to consider the action of a division to which a frontage of five miles has been allotted, this appearing to be about the extent of front a unit of the strength of a British division might take up in the preparatory as opposed to the final stage of an attack on an army holding a position from which it is desired to eject it.

The ground gained during the approach stage has by hypothesis been entrenched, villages put into a state of defence and otherwise generally fortified, so that the division advances as from a fortified base when advancing to the attack in the preparatory stage.

It must again be insisted on that the preparatory stage is really of the nature of a reconnaissance in force, from which, however, there must be no going back; all ground won must be immediately entrenched and held to the last. This steady advance will mystify and mislead the enemy, and keep him in doubt as to where the real blow is coming. It is the attackers' object during the preparation so to prepare and arrange for this blow, that when it is delivered it will come with such strength and such suddenness that the defence will not have time to bring up its reserves to ward it off.

We cannot, I think, assume that the attack will have got nearer than five miles of the main position at the end of the approach stage. That is, the attack will have reached a line about that distance from the main defensive position, when it was discovered that the first resistance met with was only from troops occupying a false front and that the general line of the main position could only be roughly fixed. It is therefore from some such distance as five miles that the attack in the preparatory stage will start from.

Aerial observation with our present appliances, captive balloons or kites, gives fairly good results up to five miles; consequently, the attack must remember that its movements can be seen and will be reported to the hostile Commander-in-Chief, unless its troops are moved about in very extended order or in very close country, *i.e.*, full of woods or houses, etc. If, however, the claims made by aeronauts, that the appearance of a dirigible balloon, aeroplane, or what not, is only a matter of possibly months, turns out to be true, we may expect to have observers hanging over us in the air, and consequently screening our movements will be much more difficult, and if the country is not very close, all movements of troops before the actual assault will have to be made by night, if there is any desire to conceal movements from the defence, which is absolutely necessary if the attack desires to take full advantage of surprise—one of the greatest elements for the success of the tactics sketched out in this paper.

The divisional general has had by hypothesis five miles of front allotted to him over which to attack. Without wishing to

lay down any hard and fast rules, it may not be wrong to assume that he will have two brigades in the first line and keep a third in reserve; each brigadier will no doubt be allotted two or three groups of M.I. to act as orderlies, and for certain, seeing the importance—ever increasing—of fortification in the field, half a company of engineers will be assigned to each brigade in the front line. Whether guns should be given to brigadiers or not is open to much argument, and will largely depend on the nature of the ground; personally I think in combined operations where a division is acting as a part of a larger force, it is better not to give guns to brigadiers, but that the divisional general should keep them in his own hands. If, however, guns are handed to brigadiers, I doubt the advisability of giving them more than a section, or at the very outside, a battery. The extent of front allotted to brigades depends entirely upon the nature of the ground. It is impossible even to suggest, for one brigade may have open country and the other close ground to advance over. For the sake of argument, let us assume the front is equally divided, and consequently two and a half miles is allotted to each brigade. When saying two and a half miles is allotted to a brigade, it will of course be understood that the whole of this front need not be filled with men. A British division has 70 guns, and even assuming that the heavy battery is taken away, the remaining guns will require a space of about threequarters of a mile to come into action on, assuming no battery occupies more than 100 yards, and there are no gaps between batteries, this shows how some of the ground will be occupied.

The divisional commander has in hand, by assumption, one brigade of infantry, all his artillery, one company of engineers, and one and a half companies of mounted infantry. After keeping back mounted men for orderlies, etc., he ought to have a whole company available, which no doubt will be principally employed in keeping up contact with neighbouring divisions.

It would be unwise to aimlessly open fire with the whole of the artillery, as nothing much is known of the hostile position, and before a heavy bombardment is begun a target is necessary. The guns should be distributed, say, by brigades, but linked up with the G.O.C. and C.R.A. by telephone, so that though dispersed, concentration of fire is possible, and two positions should be entrenched and concealed as far as possible by every artifice known to the engineer.

These gun positions will have been selected over night, not from any knowledge of the enemy's position, but with a view to bringing fire, and if possible enfilade fire, on to localities which appear to be positions, the occupation of which will assist the further advance against the enemy's position.

The action will therefore probably begin with a section opening fire here and there, *i.e.*, from each group on to what appear likely to be hostile gun positions, with a view to drawing fire, and so getting a target. Meanwhile the infantry is advanc-

ing, and this, though a palpable truth, is sometimes forgotten, and must therefore be insisted on. When guns are firing, the infantry must be advancing, otherwise the defence may keep their heads down or remain under cover unharmed, and the value of the shell fire be wasted.

The infantry advance must of necessity be irregular, for no definite orders can have been given them beyond that they are to advance within certain limits. The action will be a struggle for localities, in which the attacker will have the advantage, as, having the initiative, he can select his points of attack and mass superior forces against them. How brigadiers will deploy their commands will depend upon the circumstances of each case; but here, as in the larger case of the army, there will be a secondary and a main attack, and consequently there must be greater strength in one portion of the line than in the rest of it. If the attack has balloons, no doubt some information will be obtained by aerial observation; but too much reliance must not be placed upon this information, as the balloons must, from the necessity of the case be sent up some distance back, and the enemy being in position will have carefully hidden his men. Some part of the ground given to the brigade will no doubt be fairly open, and can be watched by a few scouts to give early notice of any hostile counter-stroke over it. The brigadiers will, of course, retain a reserve at their disposal; what the size of this may be will depend upon circumstances, but the engineers and eight Maxims should certainly form part of it. This grouping of machine guns *en batterie* must not be assumed to mean that the employment of the guns as a battery is advocated, but that they should be at the disposal of the brigadier and not of the battalion commanders, for if each battalion has its two guns, it may often happen that the commanding officer will find no opportunity of using them, or if he does try to bring them into action they may be swamped or even prevented from opening fire; moreover, they are to a certain extent conspicuous, if in the firing line will show up, and if with the battalion reserve no opportunity for their useful employment may present itself. Machine guns should only be brought into action at the critical moment to support an attack, confirm a success, or assist in warding off a counter-stroke, to do any of which they must be more useful when used by the brigadier who knows the situation of his whole line than if left with individual battalions whose commanding officers only know what is goining on in their immediate front.

Again, if kept together, the question of ammunition supply is simplified; better lines of advance can be adopted, and they can be more easily kept concealed than if forced to follow their battalions. Moreover, having all eight guns under his command, the brigadier will in all probability always have some ready to hand when he requires them; and last, but not to be forgotten, the tactical training in peace time of eight guns massed is a simpler matter than if two are with each battalion.

At dawn we may assume that the infantry scouts go out in advance of the brigade; the sections of guns open slow fire on likely points, get ranges, and draw fire. As the advance develops, some point of vantage—hill, wood, village, or what not—assumes supreme tactical importance, and, assuming this to be the case, the divisional general, in communication with the brigadier by telephone, will direct its capture and support the attack with the fire of his divisional artillery. The brigadier-general will bring up his machine guns and bring as much enfilade fire to bear as possible, and then, under cover of artillery fire, supported with rifles and machine guns, the infantry will advance as quickly as possible to the attack, and having the initiative, and assuming that orders, when the decision has been arrived at, are clear, the assault should be carried out with superior numbers and under cover of superior gun fire, and should succeed. A volume could be written on the subject of the formations to be adopted by the brigadier in such conditions; but as from what has been said above, forms of attack and distribution of troops must depend upon circumstances, and as no two sets of circumstances are the same, it is most injudicious to attempt to lay down any standard forms. One main principle only can be insisted upon, viz., that troops should be kept in hand as long as possible, and that it must be remembered a time will come when artillery fire must cease, and that for the final struggle the attack, if it is to succeed, must have succeeded in bringing superior numbers to the decisive point. Too much stress cannot be laid on enfilade fire; it is not only very demoralising and more effective than direct fire, but it can be maintained longer. The artillery will no doubt have great difficulty in knowing when to cease fire, especially as distances increase and both sides adopt inconspicuous clothing. To obviate the difficulty I think artillery officers will have to advance with the infantry, carrying a light telephone plant with them, by which they can communicate with their own commanders and stop fire when it is harassing their own infantry. Flags may be carried by the advancing infantry to show their artillery how far they have got on: but there is danger that the enemy may have similar flags and unfurl them at the very time the attacking guns should be using the very greatest intensity of fire.

As soon as any important locality has been seized, it must be at once put into a state of defence to ensure its being held in the event of a counter-stroke, which is sure to be made as soon as the defence recognises the effect of its capture; and here again it is essential that the necessary tools should be available, and unless they are carried by the troops it is hard to see how they will be on the spot when required. When a locality appears of great importance or offers a stubborn resistance to capture, the brigadier will no doubt himself direct the attack, and if necessary put in his reserve. The machine guns should therefore be at hand for the attack, which will more certainly

be the case if they are massed *en batterie* under the brigadier, and have not to be collected from the battalions, and if they are, it follows that they are available for the defensive arrangements against a counter-attack.

As the advance progresses, the divisional general will also advance, and he should select some of the localities seized by his advancing troops to further fortify and hold them with his reserve to form a rallying point or points on which his front line can retire if it should be beaten back.

It must not, however, be expected that the advance in this preparatory stage will be all so simple as has been assumed above. Some locality may prove too strong to be assaulted and taken by the first line troops, and the divisional general may have to intervene. From what has been said above it may be impossible, owing to aerial observation, to bring up reserves to reinforce the first line and to push home the attack without being observed, and so bring about a corresponding reinforcement on the part of the defence, in which case the necessary numerical superiority will not be established, and the assault, even if reinforced, fail.

It is here that night work comes in, and it would appear best for the front line to hold ground it has gained till nightfall, when, under cover of darkness, reserves can be moved and artillery pushed up to positions from which the assault can be better assisted the following day. If this night concentration and change of position is carried out quietly and without advertisement, when day comes the defence will find itself overpowered by weight of numbers and gun fire, and the position will be carried.

Supposing, however, it is a question of the last few hundred yards being so covered by fire that a daylight assault is impracticable, an assault by night may be necessary, when numbers will tell, as aimed fire will not have the effect it has by day. Commanders should confine their night operations to these two tactical operations, viz.: the reinforcement of troops insufficient in numbers to get on, and the actual assault. Long night marches and attacks at dawn appear inadvisable unless they are the only means of covering open ground unnoticed, either from the air or from the position, in which case they are necessary, and it is certain they will play an increasingly important part in the actual tactical operations on the battle-field, and must therefore be carefully practised by all arms in peace if they are to fulfil their object in war.

We have now considered in detail what the attacking troops will be doing during the preparation, and we have seen that, thanks to the initiative enjoyed by their commander and to the ignorance the defence should be in as to what the attack is doing, if it has been judiciously handled, the position has been steadily if slowly approached. During all this time the staff has been reconnoitring, studying the position with its weak and its strong points, and by the time the advance of the line has every-

where been checked, the Commander-in-Chief should be in a position to decide where he will make his decisive attack. The defence, if the preparation has been judiciously handled (all large-formed bodies being concealed not only from sight by the conformation of the ground but also from aerial observers by being kept in close country), should still be ignorant of where the main masses are, and should certainly be ignorant of the attacker's plans, and consequently cannot have any clear or correct idea as to when or where the main attack will be made.

## The Assault.

The Commander-in-Chief, having decided how he will make his final effort, issues orders for the assault, and the considering stage is now past and the daring stage has been reached. It does not much matter for our purpose what these orders are, whether to pierce the centre or to envelop and roll up a flank; it is sufficient to assume that the orders for the assault have been issued. It does not, however, follow that the time for the actual asault has come.

This final stage has its major and minor tactics; that is, as I understand the case—the collection of the various troops and forming them up for the attack, and the actual carrying out of the assault; and it is quite evident that until the troops are collected after having received their orders, no assault can take place.

Let us therefore consider the major tactics of the assault before we deal with the actual assault itself.

The preparatory stage consisted of, as has been shown, a gradual advance all along the line without developing any great strength, and in which risks were taken which the small numbers deployed did not justify, as it was confidently expected that the defence, deprived of the initiative, would be unable to do more than guess where the assault was likely to be made, and consequently would be slow to develop any powerful counter-stroke against the weak advancing troops; but a time must come when such an advance is no longer possible, and this is the commencement of the decisive stage or assault. As has been explained above, all ground gained must at once be entrenched and placed in a state of defence with a view to its being held against hostile counter-attacks, and this is possible even with inferior numbers for quite long enough to enable reinforcements to come up, owing to the great power of resistance possessed by even a small force armed with modern weapons. Thus, when the Commander-in-Chief finds his whole thin advancing line checked, and has to decide where he will assault, we may expect to find his front line entrenched at some distance, varying according to circumstances, from the defensive position. It is therefore from this distance—whatever it may be—that the main assault will have to be launched, and it is the duty of the staff to issue such orders as will ensure the required troops being concentrated unobserved by the enemy at the required point or points.

This requires careful working out, and even after the orders are actually issued may be a long process, for as has been already mentioned, the mystification and surprise of the enemy is what has to be aimed at, and if large bodies of men and masses of guns are moved about by day, they may, even if under cover from the position, be seen by the aerial observers of the defence, or at any rate, show by the clouds of dust they raise that large bodies of troops are on the move in certain directions, and thereby give the defence a hint as to the intentions of the attack.

From the above considerations it follows that these concentrating movements, where large bodies are concerned, must be carried out by night, and as movements by night are slow, more than one night may be necessary. Even when the troops are collected in the immediate vicinity of the position to be assaulted, there is much administrative work to be done before the assault can be launched, so we may assume that some time must elapse after the slow advance of the preparatory stage has been checked and the point to be assaulted has been decided upon before the assault is actually commenced.

The first care of the attacking general will be, without doubt, to get his guns, and especially his heavy guns and howitzers, into good and concealed positions, from which to cover the advance of the assaulting troops. The heavy guns and howitzers are especially important to bring up, as by now we may expect that the defence has put up sufficient head cover to ward off shrapnel fire.

As in any modern army, howitzers and heavy guns are few in comparison with field guns, it may be necessary to collect them from considerable distances, which will take time; and if the first night is not sufficient to concentrate the necessary heavy artillery, great care must be taken when the fight is continued next day not to disclose intentions by ceasing fire with heavy artillery from positions where it was active the day before. It may be a good plan to cease fire with the heavy guns and howitzers opposite the point to be assaulted until all is ready; but this all depends upon circumstances, the great object to be arrived at being surprise.

We thus see that the major tactics of the assault stage resolve themselves into concentrating unperceived strong bodies of infantry to carry out the final assault and a preponderating mass of guns, with a proportion of heavy guns and howitzers opposite the point selected for the final effort, to cover the advance of the assaulting infantry. As the close artillery support of infantry committed to a decisive assault is most important, it may be advisable to have several batteries of horse artillery near at hand which, thanks to their mobility, can more readily effect rapid changes of position than slower moving guns.

In the final stage we want our mounted troops to fulfil a double *rôle*, viz., screening and protection. The former is the duty of the independent cavalry, the latter that of the mounted brigades and divisional cavalry, who must work in close combination with the assaulting troops.

The independent cavalry wide on the flanks will be expected to prevent the hostile cavalry seeing what is going on, and to be active against the enemy's line of communications, and to be ready to harass his retreat in the event of a successful assault. The mounted brigades must give early intimation of any serious counter-stroke and make the first resistance against it in order to give the assaulting troops time to form to repulse it; otherwise in the confusion of the assault the counter-stroke may, by appearing suddenly, throw the assault into confusion and beat it back even when success is practically achieved.

The actual assault may take place by day or night; the former, if it appears to offer a good chance of success, is preferable, as confusion is avoided, the retreating enemy can be followed up by fire, and generally more decisive results can be obtained. On the other hand, a daylight assault may fail or appear impracticable, and there be nothing for it but to try a night attack, when it is not unfair to assume that fire cannot play the all-important *rôle* it does by day, and that numbers are far more valuable than when aimed fire is possible.

Let us consider a daylight assault. We will assume that our concentration has been successfully carried out and that the defence has not found out what was going on until it is too late to bring up large reinforcements. In these circumstances the more rapid the advance the more probable its success.

The artillery to cover the attack will most usefully be employed firing indirect, for the point to be assaulted is fixed and not moving, hence there is no great necessity of being able to see over the sights. Some guns, however, must be able to fire direct. These should be on the flanks, so that they may be able at once to turn on any counter-stroke which may be launched by the defender, for these counter-attacking troops will be moving, consequently direct fire will be more useful, seeing that the range can be got quicker and changed more rapidly when firing direct than indirect, and as the element of time is all important in warding off a counter-stroke, this ability quickly to alter the range and direction cannot be over-estimated.

The orders having been given them, a rapid fire is poured in from every available gun on the position to be assaulted; the more converging the fire the more effective it will be. Under cover of this fire the attacking infantry will move out and advance quickly, halting as little as possible, for it must be remembered that losses are smaller on the move than when halted. Halts when necessary will of course be made as far as possible under cover. The formations to be adopted will vary with the ground, but must be such that for the actual assault there will be weight. When this stage has been reached, it would appear as though the infantry soldier must trust to the bayonet more than to the fire effect of his rifle. The covering artillery must keep up its fire until the very latest possible moment, for as soon as it has ceased fire the defence, unexposed to artillery fire may be expected to commence a rapid aimed fire

which may stop the attack and hurl it back. If this occurs, the guns of the attack must commence firing as soon as ever they can in order to keep down the fire of the defence and so save the beaten infantry much loss. If the position cannot be won, the attack must entrench and await the arrival of night to charge over these last few hundred yards. The guns of the attack having to cease fire should be the signal for the machine guns to open on the defenders lining their trenches. Every effort must therefore be made to bring up the machine guns as near the front line as possible. Their detachments must expect heavy losses, for as soon as they open, they will become the target of every hostile gun and rifle which can turn on them.

The attacking guns must therefore be ready as soon as they have to cease fire on the infantry trenches to turn on the guns of the defence in order to save the machine guns as much as possible. One very important point must not be forgotten when launching troops to a decisive assault, and this is, that though strength and weight are necessary to drive home an attack, still there can be too many men, which will only be a hindrance instead of an assistance.

Although we have been considering the assault of one particular part of the position as though it was a particular phase of the action, in practice it will most probably be the case that there will be no general assault on one particular part of the line, and that the preparation will merge into the assault, and there will be decisive assaults all along the line similar to the general assault we have just considered, though on a smaller scale, and that from the points so gained, enfilade fire on other parts of the position will render them untenable, and so enable the position to be gradually won.

This is what happened in the Manchurian battles, and is what will probably happen again, and success or failure be due to the intelligent mutual support of brigades and even smaller units engaged in what may appear local struggles for localities. If, however, a general assault of one particular point is feasible and can be carried out, success will be more decisive than if the position is won by a succession of local struggles.

Success to be decisive must drive the adversary off his communications, but this, with the increasing size of modern armies, becomes more and more difficult, as the attack must think of its own just as much as the defence, and the victory will be quickly turned into defeat should the victorious troops moving off their lines of supply be caught when their ammunition is exhausted by even a small body of fresh troops.

Moreover, a large modern army will have several lines of supply, and if driven off, one will endeavour, often with success, to fall back by another; thus a strategically decisive success will become rarer and rarer as armies increase in size, and final success will be the result of complete loss of *moral* due to a succession of tactical defeats, though none may have had decisive strategical results.

The conclusion to be arrived at is that, other things being equal, success depends upon the man rather than on the men, that the initiative is the keystone of success, that good communication on the battle-field will largely compensate for numbers, and that with good troops on both sides, even allowing for all the advantages to be obtained by enfilade and covering fire, by skilful massing of superior numbers at a decisive point, and by judicious use of the entrenching tools, the final decision will have to be fought out with cold steel, very possibly, under cover of darkness.

Thus it is the human element, after all, that is decisive, the man dominating the men, the moral to the physical, as success to failure.

# THE POSSIBILITY OF MAKING USE OF BALLOONS AND MOTOR AIR-SHIPS IN THE NAVY.

(Translated from an Article by Captain NEUMANN, Instructor in the German Air-ship Battalion, which appeared in the *Marine-Rundschau* for July, 1908, and published by permission of the Editor of that Journal.)

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Communicated by the Director of Naval Intelligence.

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Continued from November JOURNAL, p. 1517, and concluded.

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FURTHER evidence to enable an opinion to be formed regarding the, to be expected, utilisation of air-ships in the Navy will be given by an examination of:—

## III. THE PRESENT AND IMPENDING POSITION OF MILITARY AERIAL NAVIGATION, WITH SPECIAL REGARD TO NAVAL REQUIREMENTS.

### *a. Balloons.*

The present state of development of captive, free, and signalling balloons is such as to guarantee their reliable tactical employment on active service, as has been proved by their utilisation for reconnoitring in the annual big military manœuvres. An indication of the generally favourable opinion prevailing with regard to balloons is to be observed in the fact that they have recently been introduced for military purposes in many countries; for example: Russia, Japan, Switzerland, Spain, and, very soon, Austria and America. The equipment, when the balloon is not inflated, is easy to pack and transport. The filling of the balloon can be quickly effected at any desired position, provided a small open space is available. In case of necessity the after-deck of a large ship would offer sufficient space for filling a kite-balloon of 600 cubic metres (21,190 cubic feet) capacity, 24 metres (79 feet) long and 6.4 metres (21 feet) in diameter.

The carrying of the compressed hydrogen gas in steel receptacles permits the filling and making ready of a captive balloon for ascending to be completed in considerably less than half an hour; this much increases its tactical utility, and should be of importance as regards its employment in the Navy.

The raising to, or lowering from, a height of 1,000 metres (3,281 feet) by letting out or hauling in the cable can be effected in a short time by the utilisation of a motor-winch.

The imperviousness of the material of which the envelope of our balloons is composed enables a once-filled balloon to be used for about a week with a daily replenishing.

The fact that the durability of the material of the German balloons with careful storage and skilled handling enables them to be used for at least a year is also of importance. It can, if necessary, be stored for several years before being used. These possibilities would be of special importance in the Navy, enabling a balloon equipment to be carried on board ships on foreign service.

If the captive balloon is only hit by a limited number of rifle shots or shrapnel balls its great buoyancy may still render possible a slow, gradual descent. With rapid hauling-in by means of a motor-winch, the falling of the sinking balloon on the ground or the surface of the water can be prevented.

A direct filling of the balloon from gas producers—as, for example, is always done in Russia, and to some extent in other countries with balloons for use from fortresses—limits the tactical utility of the balloon in consequence of the many hours required for filling, and requires the transporting of a not inconsiderable weight of chemicals. This method is therefore only suitable for stationary installations.

Only the employment of compressed hydrogen gas in steel receptacles can therefore be considered for use in the Navy. These filled receptacles will, of course, require to be carefully stowed on board ship. That this is practicable has been proved by the carrying of a balloon equipment and filled steel gas receptacles on board the small vessel *Gauss* in the German South Polar Expedition under Professor von Drygalski.

Moreover, the effectiveness of our method of sealing these gas receptacles has been proved by their being carried for several years during the above-mentioned South Polar Expedition, and also by their employment for about two years during the last South African campaign for filling the balloon for radio-telegraphy, when the receptacles were safely transported on board ship from Hamburg to Swakopmund.

The captive spherical balloon, which is of less weight, is still used to some extent in France and exclusively in England and other countries. In calms and very light winds it, of course, enables greater elevations to be attained, and therefore gives a greater observation area. In Germany, however, kite-balloons are almost exclusively used as captive balloons in consequence of their very much greater stability and possibility of employment.

Moreover, as now the kite-balloon possesses an arrangement for enabling it to be used as a free balloon, in the interests of simplification of the material it alone must be considered for eventual employment in the Navy as a captive balloon; it has already been so used experimentally with good results in Russia, Austria, Italy, and Sweden.

The possibility of the filled kite-balloon, if it is not required for reconnoitring, remaining in the air anchored — that is,

moored to the ground—as happens during military exercises extending over many weeks in all kinds of wind and weather, offers a further proof of their utility for active service.

A captive unmanned kite-balloon, without a car and of considerably smaller dimensions than the observation kite-balloon, has proved its utility as a signalling balloon for use during the day in the Imperial Manœuvres. For a number of years this type of balloon has been made use of, and other States, as, for example, Italy and France, have followed our example.

The filling and working of this signalling balloon is naturally carried out similarly to that of the observation balloon; but as a result of its much smaller dimensions and greater simplicity it can be done more easily and in a much shorter time. An elevation of 300 metres (984 feet) may be regarded as quite adequate with it. Signals are made with small spherical and cylindrical air balloons—blown out by means of a mechanically-worked valve — capable of being combined in various ways. Although the number of signals is limited, this method has worked well at sufficiently great distances, and over the sea the small air balloons will be seen better in consequence of their yellow colouring.

That the observation balloon, the envelope of which is coloured yellow for protection against the sun's rays, stands out clearly in the sky, and can therefore under certain circumstances be seen at great distances by the enemy, is evident. Although this is undesirable, it is a matter of no very great importance, as generally when the enemy can see the captive balloon the opponents will be within such a distance of one another that each side will always know of the proximity of the other; moreover, the sighting of the balloon permits no reliable conclusions to be drawn, as it may be sent up for the express purpose of misleading the enemy. That in observing a balloon very great errors may be made, an experience of the writer's in a free balloon has shown. After departure from an artillery firing position and proceeding in a direction corresponding to the line of fire of the howitzer batteries, these opened fire when the balloon, which was under continuous observation from the batteries, was directly over the targets at the quite low elevation of 100 metres (328 feet). In spite of the continuous observation of the slow-moving balloon with the assistance of good telescopes, the artillerymen were certain that the balloon was far beyond the danger zone. The range was only about 5 kilometres (3.1 miles).

## B. Motor Air-ships.

### *Characteristics of the Three Types.*

In recent years it has become usual to divide motor air-ships into three types, described respectively as rigid, semi-rigid, and non-rigid.

The confusion frequently arising in connection with these designations may be cleared up by the following explanation :—

Every air-ship has a fixed wind-pressure to withstand, which depends on its speed and shape. The wind-pressure the motor air-ship experiences is therefore not decided by the strength of the wind, as is the general but erroneous view, but every air-ship always experiences as much wind-pressure, and of course always from ahead, as is produced by its own speed. The wind-pressure is therefore independent of the strength of the wind. If, for example, an air-ship has a speed of 12 metres per second (26.9 miles per hour), then with every wind strength it always has a wind-pressure from ahead to resist which corresponds to its form and its speed of 12 metres per second (26.9 miles per hour). Now, the wind strength may be anything from 0 upwards. Supposing the wind strength to amount to 12 metres per second (26.9 miles per hour), then the actual speed of the air-ship is, of course, equal to 0, but the wind-pressure remains as before, corresponding to its own speed of 12 metres per second (26.9 miles per hour). If the speed of the air-ship ceases through the motor being stopped, then the wind-pressure against the air-ship also ceases, and it drifts as a free balloon with the wind; in this case, therefore, at a speed of 12 metres per second (26.9 miles per hour).

For maintaining the speed, the continuous preservation of the form of the air-ship is a *sine quâ non*.

The previously mentioned designations: rigid, semi-rigid, and non-rigid, result from the way in which this preservation of form is effected in the various types of air-ship.

The preservation of the form of the aerostat of an air-ship can be effected in the following ways :—

1. By means of a rigid metal frame-work, over which a covering is stretched; this frame-work surrounds the gas receptacle, or the various gas receptacles, where there are several, the aerostat being stiffened by stays between them. This is the so-called rigid type of air-ship, represented by that constructed by Count Zeppelin.

2. By means of one or more special air receptacles, called ballonets; these are fitted in the aerostat and can be filled with air from the car. As the aerostat loses gas through changes in the elevation, temperature, etc., the loss can always be made up by pumping the corresponding quantity of air into the ballonet.

   Air-ships of this kind are described as non-rigid. The air-ship of Major von Parseval is of this type.

3. If now an aerostat provided with a ballonet is, in addition, for increasing the longitudinal rigidity of the air-ship, laced to a horizontal base formed of metal tubes with a covering, this base being fitted

under the bottom of the aerostat, there results a combination of the two above-mentioned types, and this is designated as semi-rigid. The German military air-ship and the French Lebaudy air-ships are representatives of this type.

*The Development of the three Types up to the Spring of 1908.*

Germany is in the fortunate position of possessing all three types, each being successfully experimented with, whilst in France, generally speaking, only the Lebaudy semi-rigid type air-ships (the "Patrie" and, shortly, the "République") and variations of this type ("Ville de Paris," etc.) are being tried.

Up to the early part of 1908 other countries had not made a commencement, or had only carried out preliminary experiments without result (England with the "Nulli Secundus"); but several countries are now actively engaged with projects.

In Germany the experiments carried out in the year 1907 have, of course, not led to a final conclusion with regard to this very new weapon of war. They have, however, shown that all three of the German types of air-ship are practicable, and that all three will in the first instance be considered for military employment. How far each of the three air-ships (Zeppelin, Parseval, and Army) will be able to satisfy military requirements can only be finally proved by the continuation of experiments.

What must first be aimed at is:—

Greater endurance.
Cruising at higher elevations and for a longer time.
Frequent changes in the elevation.
Cruising in greater wind strengths.
Attainment of definite and more distant positions.
Capability of being brought to the ground at unprepared positions.

In the second place, the following must be the subject of further experiment:—

Filling, erecting, and departing from unprepared positions.
Transportability in an unfilled condition.

*Cruising Achievements.* — The maximum duration of a cruise by a motor-airship up to the present has been for from seven to eight hours; speeds of from 11 to 14 metres per second (24.6 to 31.3 miles per hour) have been attained; the greatest uninterrupted distance covered in one direction was about 240 kilometres (149 miles), during the voyages of the "Patrie" and the "Ville de Paris" in the autumn of 1907 and the winter of 1907-08 from Paris to the air-ship station at Verdun on the French eastern frontier in about seven hours with a favourable side wind.

*Maximum Elevations Attained.*—The maximum elevations intentionally reached have been about 1,300 metres (4,265 feet),

during a special trial carried out by the French Military Commission at Toul with the semi-rigid Lebaudy air-ship before it was taken over by the Army Administration. The now lost "Patrie" once unintentionally attained, as already mentioned, an elevation of 2,000 metres (6,562 feet) without suffering any inconvenience.

Up to the present, the spring of 1908, of all the air-ships here considered, the smallest, the German military experimental air-ship, has achieved the longest trip, something over eight hours.

All air-ships, with the single exception of Count Zeppelin's, which so far has depended on a floating base, have needed a special air-ship base on terra firma, where they are filled in a fixed protecting shed, from which they ascend and to which they must be brought on returning from a trip.

*Intermediate Landings.*—The German Military experimental air-ship, as well as the Parseval and Lebaudy air-ships, have effected, partly intentional and partly unintentional, intermediate landings in open country, and thus demonstrated this important military possibility, which is also of importance for the Navy as proving the practicability of intermediate landings on the coast away from the air-ship base, and, in addition, lending support to the view that it will be practicable to take an air-ship on board a ship at sea.

The Zeppelin air-ship by its landings on the Boden See (Lake Constance) has proved the practicability of intermediate landings on water.

*Strength and Composition of the Crew.*—The strength of the crew of each air-ship has hitherto varied, according to its size, from two to eight men; the Zeppelin air-ship has temporarily carried two or three more. It is necessary for an air-ship to have at least:—

1 captain, 1 engineer or artificer;

in case of large air-ships:—

1 captain, 1 helmsman, 1 engineer or artificer, 1 or 2 reconnoitring officers;

in large air-ships and for long trips:—

1 captain, 1 second-in-command, 2 engineers or artificers, 2 or more special reconnoitring officers, and, if required, 1 navigating officer and 1 assistant navigating officer.

During the progress of experiments all air-ships have, on being reconstructed or altered, always increased in size, and it seems probable that in the future they will be still further increased. A numerous crew, with reliefs for the various duties, in the case of long trips, is therefore not only possible, but also absolutely necessary, as the strain on the crew, with the considerable increase in the distances covered which is to be expected will be exceptionally great.

*Filling and Erecting.*—The filling and especially the erecting of an air-ship takes a considerable time. Military requirements, which necessitate speed, therefore demand the use of compressed hydrogen gas for filling. In Germany the filling and erecting of the military experimental air-ship has been the most rapidly carried out; in its special shed it only takes a few hours. In consequence of the dependence of the air-ship for its military employment on the weather conditions, the time necessary for getting it ready is naturally of great importance. If it takes more than a day, then this alone, on account of a change in the weather conditions, may often prevent some military duty from being performed.

The waterproof German cotton cloth used in Germany and France in the construction of the aerostat enables an air-ship to be kept full for some time and to be used for several trips, provided, of course, that it is filled up between them; the larger the air-ship, the greater the quantity of gas required to replenish it. Now, as the generating of the gas and its insertion in the aerostat requires time and a fairly large plant, the question of the size of an air-ship, as regards the Army and Navy, becomes of additional importance, which must not be under-estimated, apart from the previously discussed necessity for easy, rapid, and reliable filling, erecting and working. It will therefore always be necessary to give the preference to the smallest air-ship suitable for the reliable performance of any particular duty. This is a further argument for the desirability of providing different types of air-ships of varying sizes for carrying out various kinds of work.

*Size.*—The existing military air-ships vary considerably in size. Whilst the small German military air-ship has a cubical capacity of 1,800 cubic metres (63,570 cubic feet), being only an experimental craft, the latest French semi-rigid Lebaudy military air-ships of the "Patrie" type are twice as large; the Parseval air-ship is not much smaller, it having a capacity of about 3,000 cubic metres (105,950 cubic feet). The constructor of the semi-rigid French Lebaudy air-ships, Engineer Juillot, has already, at the commencement of the present year, submitted to the French Army authorities plans for a great increase in the size of these air-ships. The proposal is to increase the previous maximum capacity of 3,600 cubic metres (127,140 cubic feet) to 7,000 cubic metres (247,220 cubic feet), and utilise this larger type for long-distance scouting, the 3,600 cubic metres "Patrie" type being then utilised as fortress air-ships for short-distance scouting. The rigid Zeppelin air-ship, however, considerably exceeds all the above: No. 3, which made several trips in the autumn of 1907, has a capacity of 11,800 cubic metres (416,690 cubic feet). This will be again exceeded by Zeppelin No. 4, which is now under construction and will shortly be completed. This air-ship will be 135 metres (443 feet) long, and have the enormous capacity of 15,300 cubic metres (540,340 cubic feet).

*Transportability when Unfilled.*—An important requirement for military and naval air-ships is transportability in an unfilled condition. This demand can be met by the semi-rigid military air-ship, and still more easily by the non-rigid Parseval air-ship. The rigid air-ship, however, cannot fulfil this requirement. In the case of the military air-ship, the long rigid stiffening base, constructed of metal tubes with a cloth covering, fitted under the aerostat, can be taken to pieces, and is therefore transportable. In the Parseval air-ship, apart from the car, which is about 5 metres (16.4 feet) long, none of the principal parts, not even the propellers, are of rigid construction; it is therefore easily transported, as was proved by the facility with which it was taken away after a landing in the neighbourhood of Berlin.

*Motors.*—The motive power for these motor air-ships has up to the present been furnished by benzine motors, which vary in weight from about 2 to 4 kilogrammes (4.4 to 8.8 lbs.) per H.P. The following are the powers of the motors fitted on certain air-ships:—

French air-ship "Patrie," 1 motor of 70-H.P.
French air-ship "Ville de Paris," 1 motor of 70-H.P.
German Parseval air-ship, 1 Daimler motor of 90-H.P.
German Zeppelin air-ship, 2 Daimler motors of 90-H.P. each.

The exceptionally light French Antoinette motors, weighing only about 2 kilogrammes (4.4 lbs.) per H.P., have generally proved less reliable and therefore not so efficient as the somewhat heavier German motors, by which they have in many cases been replaced. As a further reduction in the weight of the German motors may be expected in the near future, the fitting of more powerful motors, and therefore an increase of speed, will be possible, so that in considering the possibilities of air-ships, speeds of 15 metres per second (33.5 miles per hour) can well be reckoned on.

The Zeppelin No. 4 air-ship, 135 metres (443 feet) long and of 15,300 cubic metres (540,340 cubic feet) capacity, now under construction, is designed for two Daimler motors of 110-H.P. each. With these, an increase in the speed previously obtained with the rigid air-ship is probable.

*Speeds Attained.*—The following speeds have been attained up to the present time:—

Parseval air-ship, about 11 metres per second (24.6 miles per hour).
"Patrie" (now lost), about 13 metres per second (29 miles per hour).
"Ville de Paris," 10 to 11 metres per second (22.4 to 24.6 miles per hour).
Zeppelin No. 3: with 2 motors, about 14 to 15 metres per second (31 to 33½ miles per hour); with 1 motor, nearly 10 metres per second (22.4 miles per hour).

*Possible Duration of Cruises.*—The longest trips of which air-ships already constructed are capable may be taken to be as follows:—

Parseval air-ship, about 10 hours.
"Patrie" (now lost), from 10 to 12 hours.
"Ville de Paris," about 10 hours.
Zeppelin No. 3, nominally 48 hours.

As an examination of the details of the various air-ships is beyond the scope of this article, a summary of the equipment and performances, already achieved or to be expected, of a representative of each of the three types of air-ship is given in the tables on the following pages.

## IV. The Possibility and Method of Utilising Balloons and Motor Air-ships in the Navy.

### *General Remarks.*

In the following pages the purposes for which balloons and motor air-ships, in their present state of development, might be utilised in the Navy will be briefly discussed; the results of the preceding examination of their capabilities will be taken as a basis. In doing this it will be borne in mind that in spite of their various possible uses in naval warfare, for example, for reconnoitring, they are, as far as can be seen at present, only auxiliaries, supplementing the vessels of various types which are suited to all the conditions met with at sea and therefore constitute the natural and most appropriate weapons of naval warfare.

Generally speaking, the possibility of utilising balloons and motor air-ships in the Navy is beyond question. They will, however, be affected by weather conditions—fog and wind—more than over the land.

If the weather conditions permit a balloon or motor air-ship to be sent up—this will be the case on a considerable number of days of the year, as has been seen in the preceding examination, undertaken with this object, of the average weather conditions and the present state of development of balloons and motor air-ships—then the reconnoitring possibilities, in consequence of the more dust-free and clearer air and the absence of various obstructions to the field of view met with ashore, are greater over the sea than over the land, the observation area being very considerably larger.

The following may be considered for utilisation in the Navy: captive balloons, free balloons, motor air-ships, signalling balloons, balloons for measuring the wind strength at various elevations.

Captive balloons and motor air-ships would, of course, in the first instance, be utilised for reconnoitring. The motor air-ship, in its present state of development, could perhaps be used to a limited extent as a weapon. The occasionally expressed

## SUMMARY OF THE THREE TYPES OF MOTOR-AIRSHIP—NON-RIGID, RIGID, AND SEMI-RIGID.

| | | Parseval 1907 Airship. | Zeppelin 1907 Airship. | "Patrie." |
|---|---|---|---|---|
| System ... | | Non-Rigid. | Rigid. | Semi-rigid. |
| The Aerostat | Length... ... | 50 metres (164 feet) ... ... ... | 128 metres (420 feet) ... ... ... | 60 metres (197 feet). |
| | Capacity ... | About 3,000 cub. m. (105,950 cub. feet) | 11,800 cub. metres (416,690 cub. feet)... | About 3,600 cub. m. (127,140 cub. feet). |
| | Diameter ... | 8·5 metres (28 feet) ... ... ... | 11 metres (36 feet) ... ... .. | 10·3 metres (34 feet). |
| | Material ... | Double waterproof cotton ... | Single strong waterproof cloth ... | Waterproof cotton. |
| | Ballonet ... | 2 of 600 c.m. (21,190 cub. feet) total capacity | None... .. .. ... ... ... | 1 of 650 c.m. (22,950 cub. feet) capacity. |
| | Means of ensuring stability | 2 lateral planes aft ; 1 underneath .. | 2 lateral double planes aft and a long keel-plane. | 2 fins aft ; keel-plane underneath. |
| Rigid base for stiffening the longitudinal axis of the aerostat, and to which the car, propellers and rudders are attached. | | Only the stability planes and the rudder are stiffened—by means of bamboo poles. | The whole ship consists of a rigid frame-work over which a covering is stretched and within which are 16 gas receptacles. | Rigid base of nickel steel tubes, with a covering stretched over it and having a sort of bird's tail aft to which the rudder is attached. |
| The Propellers | Kind and method of attachment | Slack cloth propeller, attached to a platform above the car. | 2 pairs of 3-bladed propellers, at the side of the aerostat above the 2 cars. | Two 2-bladed propellers, at the side of the car on the motor axle. |
| | Number of blades on each propeller ... | 4 | 3 | 2 |
| | Number of revolutions ... | 800—1,000 | 1,000—1,200 | 1,000 |

| | | | | |
|---|---|---|---|---|
| The Car... | Construction and method of suspension | Steel tubes with wire netting; covered with cloth; hung by wire ropes. | Steel tubes and aluminium; fixed rigidly to the frame-work. | Steel tubes and aluminium; covered with cloth; hung by wire ropes. |
| | Carries.. .. | 4 persons; 1 motor with cooling apparatus; benzine for 10 hours; instruments, etc. | 11 or 12 persons; 2 motors; benzine for 48 hours; 1,000 to 1,200 kilograms (2,204 to 2,645 lbs.) of water ballast. | 4 to 6 persons; 1 motor with cooling apparatus; benzine for 10 to 12 hours; ballast. |
| The Motor | Number ... | 1 | 2 | 1 |
| | Power ... ... | 90-H.P. | Each of 90-H.P. | 70-H.P. |
| | Number of revolutions | 1,000—1,200. | 1,000—1,200. | 1,000 |
| | Make ... ... | Daimler. | Daimler. | Panhard-Levasseur. |
| Steering Apparatus | Horizontal steering | Underneath, aft, fixed to a special plane; rigid. | 2 twin rudders between the stability planes. | Rudder, aft, on the bird-like tail. |
| | Vertical steering | Effected by pumping air from one ballonet into the other. | 4 twin vertical rudders, forward and aft, underneath, fixed to the rigid frame-work. | One pair forward at the side, fixed to the frame-work; 1 pair aft. |
| Landing Equipment... ... | | Trailing rope, 150 metres (492 feet) long; 1 gas valve; 2 tearing cords ("Reissleinen"); water ballast. | Self-filling sacks as water anchor; cable and anchor; 6 valves; water ballast. | Trailing rope; "Serpente"; gas valve; sand ballast. |
| Capability ... ... ... | | 11 metres per second (24·6 miles per hour). | With 1 motor, about 10 metres per second (22·4 miles per hour), with 2 motors, 14 to 15 metres per second (31·3 to 33·5 miles per hour). | Stated to be capable of 13 metres per second (29 miles per hour). |
| Height ... | Has attained ... | 1,000 metres (3,281 feet). | 450 metres (1,480 feet). | 1,280 metres (4,200 feet). |
| | Intended to attain | 1,500 metres (4,921 feet). | 1,500—2,000 metres (4,921—6,562 feet). | 1,500 metres (4,921 feet). |
| Longest uninterrupted trip up to the present | | About 3 hours. | About 7 hours. | About 7 hours. |

opinion that with the perfecting of the motor air-ship, the *raison d'être* of the captive balloon will wholly disappear is not justified as regards the Navy. Both will continue to be necessary, and will be able to advantageously supplement one another. The captive balloon will continue to be used for reconnoitring the immediate neighbourhood; the motor air-ship will supplement it, and will also be used for long-distance scouting.

### *Captive Balloons.*

The kite-balloon alone is to be considered for use as a captive balloon in the Navy. The spherical captive balloon is unnecessary. The kite-balloon, as used in the Army, is in principle ready for employment in the Navy. Whether its present normal size of 600 cubic metres (21,190 cubic feet) should be increased for naval purposes to about 750 cubic metres (26,488 cubic feet), as for example, has been done in recent years in the Russian naval ballooning division at Vladivostok, is a matter of opinion.

The capabilities of the captive balloon, height to which it can ascend, and therefore its field of view and accuracy of observation, as well as its carrying power—ability to take two reconnoitring officers even in a strong wind—increase with its size; on the other hand, the amount of gas required also increases, and this is of considerable importance in coming to a decision as regards its size, especially in providing for filling on board ship. On the coast or in harbours the increased gas requirements would not be of much importance; but it must be considered whether, in the interests of uniformity of the material, it is not preferable to adopt one size for both cases, and therefore to decide on the 600 cubic metres (21,190 cubic feet) of the Army kite-balloon.

### *Free Balloons.*

If a Navy goes in for aerial navigation it will scarcely be able to ignore free balloons. These will generally only be used for training the crews of captive balloons and motor air-ships. As regards the latter, for example, to enable the men to become fairly accurate in dropping explosives, for which they can be thoroughly trained more simply and more economically in free balloons than in air-ships.

The free balloon will scarcely be required in the Navy for supplementing the reconnoitring of the captive balloon or as a means of communication, although in the Army — especially during siege operations—it is of very great value for these duties.

Free balloons are now technically so reliable and so perfectly developed that any kind or size is available for use in the Navy, and only need skilled handling in order to work well.

On account of its greater capabilities, the smaller free balloon filled with hydrogen gas is to be preferred to the larger balloon filled with coal gas, which has less lifting power, more-

over, filling with coal gas necessitates the proximity of plant for producing coal gas, and therefore can, generally speaking, only be effected on shore.

The spherical balloon is generally used as a free balloon, but the kite-balloon is also capable of being used as such in exceptional cases.

*Captive Balloons and Motor Air-ships.*

In the first instance, captive balloons and motor air-ships, in their present state of development, will be utilised on the coast, in harbour or before a harbour, and will be of special value in a blockade or in an attack on a fortified coast town. The duties of balloons and motor air-ships will here, for the most part, be very similar to their duties in siege operations on shore, and consequently their prospects of success will be very much the same in both cases.

These duties, in the present state of aerial navigation, will chiefly consist of observation and scouting; the question of their utilisation as offensive weapons will probably remain in the background for the present. Amongst other things, they will be required for observation of a blockaded fleet or a blockading squadron (for example, the direction in which it withdraws in the evening, possible mining operations, etc.), observation and direction of artillery fire (especially by means of captive balloons), locating coast fortifications, etc.

There is no doubt whatever that during the blockade of Port Arthur, for example, the rational employment of a captive balloon or a motor air-ship, by either the Japanese or Russian fleet, would have been of considerable value from any of the above-mentioned points of view.

A proof of the value of the captive balloon for co-operation between the Army and the Navy was furnished during the Imperial Manœuvres of 1904 on the Baltic coast near Wismar, where the kite-balloon reported the approach of a squadron when it was at a distance of 32 kilometres (20 miles).

Balloons and motor air-ships, under certain conditions, could also perform good service abroad with expeditionary forces. For this the captive balloon equipment must be lighter and capable of being more easily transported than that used at home, and it is to be considered whether for such purposes it will not be desirable to construct a specially light air-ship. The air-ship would first have to be based on the landing position, but later perhaps its base could be advanced further into the interior.

The conditions for the employment of balloons and motor air-ships on their own coasts are specially favourable, as in the case of the defender in siege operations. Stationary balloon and air-ship stations can be built and specially equipped for the purpose in peace time. The important question of gas production and replenishing here presents no particular difficulties. This question of gas production will generally necessitate

the large semi-rigid and rigid air-ship, with the greatest radius of action, being based on fixed or floating coast air-ship stations.

The present relative speeds of air-ships and war-ships will now be briefly considered.

If we assume that a hostile fleet steams at a speed of 15 knots, then, under the most unfavourable conditions—that is, with a head wind—provided its strength is not more than 8 metres per second (17.9 miles per hour), an air-ship with a speed of 15 metres per second (33.5 miles per hour) can follow this fleet and keep it under observation. As, however, wind velocities of less than 8 metres per second (17.9 miles per hour) are not very frequent at sea, it follows that for this special duty air-ships of less speed than 15 metres per second (33.5 miles per hour) will not be of much use.

If, further, we take the speed of cruisers to be from 20 to 23 knots, then an air-ship having a speed of 15 metres per second (33.5 miles per hour) would not be able to follow and keep up with them for long, similarly assuming the most unfavourable condition of a head wind, except with wind velocities of less than from 3.3 to 5 metres per second (7.4 to 11.2 miles per hour).

A similar air-ship would only be able to follow torpedo-boats having a speed of 30 knots in a calm.

On the other hand, if the most unfavourable conditions for the following of hostile war-ships by an air-ship, namely, a direct head wind, is not met with, the chances of the air-ship become, of course, more favourable, according to the extent to which the wind is in its favour, until finally with the wind directly aft, it attains its maximum speed and can then easily keep up with torpedo-boats.

For high-sea operations, the employment of balloons and motor air-ships in their present state of development will scarcely come into consideration. The radius of action, in particular, of air-ships is not sufficient for distant operations at sea, and there are technical difficulties in connection with the employment of a balloon or motor air-ship from a vessel. Special installations would be necessary for filling, erecting, sending up and hauling in a balloon or motor air-ship, as well as for safeguarding it when stowed in a filled condition. As these installations, on account of rigging and other obstructions, could only be constructed, even on board large war-ships, with difficulty and in a makeshift fashion, and then only for a balloon—in no case for a motor air-ship—it seems probable that with the present limited radius of action of motor air-ships only the construction of special parent vessels can lead to their employment on the high seas.

*Parent Vessels for Balloons and Air-ships.* — How the filling, erecting, sending off and taking on board again of a motor air-ship is to be carried out on board such a vessel must first be decided by experiments, as no experience has yet been gained with regard to these operations. With an anchored

vessel or one under way in a smooth sea, there will probably be no insuperable difficulties in filling and erecting a balloon or motor air-ship. In a heavy sea it will scarcely be practicable—in any case, not for a motor air-ship. Under such circumstances the employment of the latter would probably not come into question, as the prevailing wind strength would generally prevent its use. A utilisation of the kite-balloon might, however, be possible.

Only the semi-rigid or non-rigid type of air-ship could be worked from such a special parent ship. The possibility of sending up an air-ship from a vessel at sea would very considerably extend the limits of its utility for scouting and render it capable of performing work for which its radius of action would not otherwise have been sufficient.

What are the essential features of a parent ship on board which captive balloons and motor air-ships can be filled and erected, and from which they can be worked? It must possess the following characteristics and special installations:—

1. Considerable size, on account of the necessity for the installation of a kind of balloon shed.
2. High speed.
3. As little rigging and other obstructions above deck as possible.
4. Fittings for the safe stowage of as great a number as possible of filled gas receptacles and for their easy exchange when emptied.
5. In the after part of the ship, a long, deep, clear space for a balloon shed, whose walls and roof must be so arranged that a balloon or air-ship can be sent up directly from it.
6. Provision of arrangements for filling in this shed and for the safe stowage of the necessary gas receptacles.
7. Motor-winch for use with the captive balloon.
8. Electrolytic hydrogen installation for generating gas on board.
9. Radio-telegraphic apparatus.
10. Means of preventing the throwing out of sparks from the funnel.

For a kite-balloon of normal size the shed on board the parent ship must be about 30 metres (98 feet) long and 10 metres (33 feet) wide; a height of 15 metres (49 feet) would enable the captive balloon to be made completely ready for ascending under shelter from the wind, and is very desirable, though not absolutely necessary. The construction of a parent ship intended only for use with a kite-balloon would be relatively simple as compared with the construction of one intended to serve for the filling and erecting of, and as a starting-point for, a motor air-ship, as well as for its stowage in a filled condition

on return. For this a very considerably larger shed would of course be necessary. One of the following approximate dimensions would be suitable for an efficient semi-rigid air-ship: 70 metres (230 feet) long, 15 metres (49 feet) wide, 20 metres (66 feet) high.

These dimensions are undoubtedly very large. If, however, they are possible on a special vessel, then the employment of an air-ship from a ship at sea is probably practicable, although difficult. The further development of the radius of action of motor air-ships and the consequent possibility of their being based on the coast for high-sea operations, is, however, likely to give better results. The radius of action of air-ships is therefore of special importance for the Navy.

That special parent vessels for kite-balloons are practicable the Russian balloon vessel *Russ*, of Rozhestvenski's fleet, has demonstrated; she was merely a specially fitted fast steamer. Sweden also already possesses a special balloon-ship for the observation of the rocky islands along her Baltic coast by means of captive kite-balloons. As a kite-balloon can be filled and made ready for ascending in less than half an hour, the employment of a balloon-ship permits a balloon reconnaissance to be carried out at sea at any moment in the shortest possible time if the velocity of the wind is not very great; moreover, it can be rapidly hauled in after the desired observations have been made and quickly placed in the protecting shed in a filled condition, where it will remain ready for use when required for about a week.

*Towing of a Balloon by a War-ship.*—If a balloon-ship is not available, there is another possibility for the employment of a captive balloon at sea at short distances from the coast; a kite-balloon filled on the coast or in harbour can be towed out to sea by a torpedo-boat or other war-ship, without the latter's speed being much reduced even with a head wind. Such an experiment was carried out at Friedrichsort during ballooning exercises in 1897. This method is also possible with a captive spherical balloon in a calm, and with a slow speed of the towing vessel, as, for example, was shown during experiments carried out by the French Navy off Toulon in calm weather at the end of 1880, the towing being done by a torpedo-boat as well as by a large war-ship. Similar experiments made by us off Heligoland in 1891 showed the uselessness of using a captive spherical balloon in this way in a wind.

*Towing of a Motor Air-ship by a War-ship.*—That a motor air-ship can also be towed by a steam-ship, if the wind is not too strong, appears evident. (For example, the already mentioned experiment of the American, Wellman, in his attempted trip to the North Pole in 1907.)

*Possibility of Detecting Mines and Submarines.*—The increased appreciation of mines since the Russo-Japanese War,

as well as the great development of submarines in all navies, has caused great interest to be taken in the question as to whether and to what extent captive balloons and motor air-ships are capable of being employed to counteract these concealed weapons, and also as to the possibility of their being used for guiding war-ships through a mine-field.

A positive answer to these questions can only be given after suitable experiments have been carried out. In some early experiments made in the French Navy successful results were obtained in clear water; they maintain that during experiments in the harbour of Toulon several years ago, the submarine *Gustave Zédée* was detected in clear water from a captive balloon soon after it was sent up; it was thus demonstrated that the green paint of the submarine does not prevent it from being detected.

On the other hand, in experiments carried out by the Russian Navy in the Gulf of Finland in 1894, a captive balloon failed to discover the sunken war-ship *Russalka* in troubled water.

*Employment at Night.*—Night reconnoitring by means of a captive balloon promises only partial and unreliable results, so long as the enemy's lights are visible. If these are obscured no results can be expected.

Only practical experiment can determine whether reconnoitring at night with a motor air-ship is possible; for example, whether it would be possible for an air-ship, which before darkness came on, found itself in the immediate neighbourhood of a hostile squadron, to keep at a low elevation over this squadron during the night. Perhaps the air-ship would be able to follow the squadron, keeping it under observation, if the latter did not steam without lights.

If this should be the case, then an air-ship could keep touch with a blockading squadron when it drew back at night, perhaps throwing a searchlight on it for a few moments at intervals, and by means of special light signals direct the attack of its own torpedo-boats.

In the contrary case of an attack by the enemy, an air-ship could at night, by means of flashing signals, warn its own fleet in good time of the approach of the hostile torpedo-boats belonging to the blockading squadron.

How far it is possible to employ the various kinds of flashing signals without danger to the air-ship must also first be reliably established by special experiments.

If the experiments being made for the installation of radio-telegraphic apparatus on air-ships meet with success, then this would be able to form a valuable supplement to the searchlight and special light signals.

So many problems have needed solution in connection with aerial navigation that up to the present no experience has been gained with regard to long night cruises. The carrying

out of such night cruises over land, which is to be expected in the near future, will give a reliable basis for conclusions to be drawn with regard to night reconnaissances and the possibility of observing squadrons and flotillas at night in the manner referred to above. These experiments will also furnish information as to how far a definite course can be kept at night by an air-ship; this will present special difficulties in cruises over the sea.

*Air-ships for offensive use by the Navy.*—As already mentioned, in the near future air-ships will come into prominence for naval reconnoitring; in addition, they may occasionally have opportunities for destroying, amongst other things, ships, naval establishments, docks, and, perhaps, also coast fortifications which are not bomb-proof. Moreover, the moral effect of air-ships, capable of being used offensively, in proximity to a blockading squadron, to a squadron lying in a harbour, or to coast works, must not be overlooked.

The quantity of explosives which an air-ship can carry, without reducing its ability to carry out its special duty of reconnoitring, is at present relatively small; moreover, at a great height there is no certainty of hitting. The employment of one—or, better, several—air-ships offensively, for example, against a blockading squadron, will, however, present no special difficulties, as in this case they could be filled at, and started from, special sheds on the coast, and the short distances would permit a greater quantity of explosives and ballast being carried. An increased quantity of the latter would in such a case be necessary in consequence of the rapid ascent of the air-ship resulting from the dropping of explosives; the ingenious checking of the ascent by pumping air into the ballonet can only be carried out to a limited extent, as the escape-valve of the ballonet must only allow a fixed amount of over-pressure, so as not to put too great a strain on the envelope of the aerostat by a much increased interior pressure. On the other hand, the suitably fitted steering planes and the great surface of the air-ship will tend to check a too rapid ascent after the dropping of explosives.

The employment of an air-ship offensively from a blockading squadron is dependent on the presence of a special parent vessel; if this is forthcoming, the air-ship's prospects of success are more favourable than in the contrary case of employment against a blockading squadron, as the objects of attack are more numerous and more concentrated, and, for the most part, immovable.

The chances of hitting when dropping explosives decrease with the elevation. As it is possible to get directly over a hostile squadron at night at a low elevation, from this point of view the prospect of hitting is then more favourable; moreover, the moral effect would then also be much greater.

*Signalling Balloons.*

As a result of the continuous development of radio-telegraphy, the question of the employment of signalling balloons in the Navy is scarcely of importance; but for the sake of completeness it is briefly dealt with here.

A signalling balloon can be easily and rapidly transported, filled, sent up, and hauled down on board a war-ship or torpedo-boat. Of course, the carrying of compressed hydrogen gas in steel receptacles on board the vessel would be necessary, and this would place some limits to the free use of the balloon, requiring it to be kept for emergencies. From this point of view it would have to be considered whether all ships, or only the flag-ship of the squadron and cruisers, should be equipped with such signalling balloons.

If, however, a special balloon-ship with plant for generating and compressing hydrogen gas accompanies a squadron, then the signalling balloons could be replenished with gas as necessary.

Balloon signals made at a height of about 300 metres (984 feet) for communication between ships, or from ship to shore, would be distinguished more easily and at greater distances than other signals.

The number of signals at present possible by the combination of the various kinds of small spherical or cylindrical yellow balloons, blown out with air, attached to the signalling balloon, would perhaps not be sufficient for naval purposes, but they could be increased.

In the year 1891 some experiments carried out by the Navy at Heligoland with a signalling balloon, signals being made by means of small spherical balloons and flags, were not successful, as the signals could not be distinguished at a sufficiently great distance. Perhaps a small kite-balloon with shape signals would give better results.

At night the signalling shapes could be replaced by lamps fitted to the signalling balloon, with which the Morse code could be used, as have already been experimented with in the Russian Navy on a small spherical balloon.

*Balloons for Measuring Wind Strengths.*

In order to come to a decision as to whether an air-ship of a certain maximum speed can be used on any particular day, it is very desirable to know the strength of the wind at various elevations. The small signalling kite-balloon just considered, fitted with self-registering barometers and anemometers, and special arrangements for enabling the wind strength prevailing above to be read off from the ground, has proved very useful for this purpose.

*Naval Air-ship Stations.*

With successful further development, all three types of air-ship could be considered for employment in the Navy. In their present state the following are capable of being utilised:—

1. The semi-rigid air-ship of various sizes for short-distance and long-distance scouting. In both cases it could be used offensively and probably also from a special parent vessel.
2. The non-rigid Parseval air-ship for short-distance scouting; probably also capable of being filled on board and worked from a special parent vessel, and to a limited extent of being used offensively.
3. The rigid Zeppelin air-ship for long-distance scouting and offensive action.

The naval air-ship stations could be both fixed and movable: for semi-rigid and non-rigid air-ships, on land; and for the rigid Zeppelin air-ships, afloat.

In equipping a naval air-ship station the following may have to be provided for: captive balloons, free balloons, balloons for measuring wind strength, air-ships for short-distance and air-ships for long-distance scouting, special parent vessels.

There would have to be, according to the number and the size of the air-ships: permanent balloon sheds, hydrogen gas producing plant with a compressing installation, workshops.

The number of stations, fixed as well as movable, to be provided will, apart from monetary considerations, depend on the strategical and tactical requirements.

Whether air-ship stations are to be used for both balloons and motor air-ships or only for one of them, will determine the position and equipment of each station.

So far as motor air-ships are concerned, the provision of stations can be considered when further experiments with the three systems have led to definite, reliable, and practical results, which is to be expected in the course of the next few years.

Captive balloons, free balloons, and signalling balloons are already quite practicable, and only need a few alterations as regards details in order to be suitable for naval purposes.

Special parent vessels must, however, be designed and experimented with, especially as to whether they can be used for motor air-ships.

The area which comes within the sphere of an air-ship station may be briefly illustrated by the following example: assuming a French naval air-ship station at Brest, from which an area bounded by the Dover-Calais line is to be reconnoitred, then this would mean a direct voyage of about 500 kilometres (310 miles) for an air-ship. A semi-rigid air-ship having a speed of 15 metres per second (33.5 miles per hour) and fuel for 20 hours at this speed would be able to do the double journey in a calm. As, however, the "field of action" diminishes with an increase in the strength of the wind, then the air-ship would not be able to carry out this duty in a wind unless it had a parent vessel at sea from which it could set out and be taken on board again on returning.

## V. Aerial Navigation in Foreign Navies.

### *France.*

France was the first of all countries to actively take up aerial navigation, especially as regards military air-ships, and also to make use of balloons for naval purposes.

The first experiments in the latter direction were carried out in the year 1888 at Toulon with a small captive spherical balloon of only 320 cubic metres (11,302 cubic feet) capacity, which had been specially constructed for this purpose by the well-known French aeronaut, Colonel Renard, who died a few years ago.

The experiments were carried out in calm weather, first from the war-ship *Implacable*, lying at anchor in Toulon harbour, and later from the war-ship *Indomptable*, which steamed out to sea towing the balloon which was manned by a naval officer. The balloon was subsequently released and finished its trip by alighting on the sea, when the balloon and the officer were picked up by the war-ship.

Further experiments included the towing of the balloon by torpedo-boats, and numerous ascents by naval officers of all ranks, observations being made from the balloons; these, in consequence of the weather being favourable, gave good results, and a naval ballooning division was shortly after established at Lagoubran, near Toulon; subsequently another was established at Brest. Both divisions were done away with in 1904, probably because the inadequacy of the captive spherical balloon for naval purposes was recognised, and the German kite-balloon had not been introduced into France.

Apparently the French Navy has recently again taken up the study of aerial navigation, and anticipates the employment of air-ships. In any case, it was recently stated in the Press that it is intended to equip the squadrons with kite-balloons.

### *Russia.*

After early experiments in aerial navigation, which only ended in the introduction of a spherical balloon with electric light in its interior as a signalling balloon for coast defence, in the year 1902 a naval ballooning division was formed at Sebastopol. This at first only used small captive spherical balloons of 360 cubic metres (12,710 cubic feet) capacity, but in the year 1905 German kite-balloons were procured.

The hydrogen gas necessary for filling the balloons is, as in the Russian Army, generated by means of transportable plant on its being required. For this several hours are necessary, so that it is impossible to make use of the balloon promptly at a critical moment, as can be done if compressed hydrogen is employed. It appears, therefore, that it is only intended to use the balloon in the harbour.

In addition, since the Russo-Japanese war, Russia has had a ballooning division at Vladivostok, which, after the German

model, is well equipped with large spherical balloons of 600 cubic metres (21,190 cubic feet) capacity, and special large, efficient kite-balloons of 750 cubic metres (26,488 cubic feet) capacity.

As, further, since 1905, there has been a specially strong fortress ballooning company with numerous modern balloons of German pattern (750 cubic metres kite-balloons, with motor-winches) at Vladivostok, this port is very well equipped with ballooning apparatus.

At the commencement of the blockade of Port Arthur, this important war harbour possessed no organised ballooning corps. A division improvised during the siege could achieve no particular success with its two spherical balloons, and again demonstrated that an efficient ballooning organisation, *matériel* and *personnel*, cannot be improvised at a critical moment, but must be carefully prepared beforehand during peace time, which specially applies to the training of qualified observation-officers.

Accurate observation from a balloon requires long practice; it is not possible, on making an ascent for the first time, to see everything and see it correctly, as is frequently assumed. Moreover, with well-trained observers the number required is not so large. The best ballooning *matériel* is illusory if the observers are technically, tactically, or physically incompetent. Numerous examples in big manœuvres have shown what a valuable means of reconnoitring a balloon is if the right man is in the car, provided, of course, that the weather is fairly clear.

In 1904, during the Russo-Japanese War, a large steamer, the *Russ*, was specially fitted as a balloon-ship, equipped with kite-balloons, and attached to the Russian fleet under the command of Admiral Rozhestvenski. The experimental ascents made from this ship in the Baltic before departure resulted satisfactorily. In spite of this, the balloon-ship, which left in February, 1905, with Admiral Nebogatov's division, soon returned to its starting point, as, on examination, the boilers were found to be defective.

The results of the work of a committee formed some time ago at the Russian Admiralty to consider the question of forming a new ballooning division for the fleet, have not, up to the present, become public.

### *Italy.*

In 1905 Italy formed a ballooning section at Ancona for experiments with the torpedo-boat flotillas at that place. Experiments on board the war-ship *Elba*, etc., with the German kite-balloon as a captive balloon, have given good results.

### *Austria-Hungary.*

In 1902 experiments were carried out with a captive spherical balloon from the battle-ship *Monarch*, and later from

the *Radetzky*, with a kite-balloon. Austria has not, up to the present, possessed any special ballooning organisation.

*Sweden.*

Sweden has had, since 1902, a special balloon-ship, which is equipped with a large captive kite-balloon of 750 cubic metres (26,488 cubic feet) capacity, for the observation of the islands on its Baltic coast.

*Japan.*

The Japanese Navy is said to have made use of a captive spherical-balloon for a short time in the latter part of the blockade of Port Arthur. If this is correct, it is unlikely that this improvised equipment was of much value.

*England.*

England, as is well known, has carried out no experiments with balloons in the Navy, perhaps for the following easily understood reasons:—

1. The large number of ships in the British Navy has so far prevented any desire being felt to supplement them, for reconnoitring, etc., by balloons; further, the development of any war instrument which the Navy might find detrimental to its effective action is not in the interests of England.

2. England only employs in her Army spherical balloons, whose value for naval purposes is very limited, as has already been pointed out. Moreover, these English spherical balloons, having regard to their chief employment on land in colonial wars, are constructed of a very light gas-tight material called goldbeater's skin, which is made from the entrails of animals; on account of the ease with which they can be refilled with gas, these small balloons may be very suitable for a colonial war, but they are not adapted to naval requirements.

As England, after the wreck in 1907 of the experimental air-ship "Nulli Secundus," in the construction of which goldbeater's skin was also used, is now engaged in the construction of a motor air-ship of the semi-rigid "Patrie" type, it must be assumed that in the near future the Navy will take up the question of aerial navigation. This is also indicated in a speech which the Commander-in-Chief of the English Channel Fleet, Lord Charles Beresford, made in the presence of the officers of the French armoured cruiser *Léon Gambetta*, when, amongst other things, he said:—"France was ahead of England in destroyers and submarines, and now in air-ships. When it came to using air-ships in warfare, he hoped the French and English air-ships would fight side by side."

# DEFENCE OF HARBOURS BY FORTIFICATION.

*By Brigadier-General R. F. JOHNSON, C.M.G., R.A.*

Continued from November JOURNAL, p. 1549.

## II.—*Light Q.F. Guns.*

THE part played by these weapons is confined almost entirely to stopping the attempts of torpedo craft to penetrate into the harbour, and that should be the sole object kept in view when siting them, except, of course, where they are specially mounted for the defence of mine-fields. If fighting ships come within their range, which is not likely, their fire can do no appreciable harm to the ships, while it will disclose their positions and may lead to their being disabled for their proper duty. They may render considerable service in defeating the attempts of blockers, boom-smashers, and raiding vessels by fire on their decks, but their use for this purpose requires caution, as torpedo craft may take advantage of their attention being diverted from themselves.

As the attack will undoubtedly as a rule be made in the hours of darkness, electric lights are essential adjuncts to the guns, and the conditions governing their effective installation may to a certain extent affect the choice of sites for the guns. The lights must illuminate effectively the whole area of water through which the boats can pass; they should be near the sea level, to prevent the possibility of boats creeping under their beams, and also because the target can be better seen from the gun when the latter is higher than the light, and they should be so disposed in plan in relation to the guns as to give the best illumination of the target, which is a matter best settled by experiment. This does not imply that the siting of the lights is more important than that of the guns, but only that a compromise may have to be sought for when the demands clash.

The greater portion of the guns must be so placed as to have the boats under fire as far out of the harbour as possible; but when there is a boom it must have some immediate gun defence, for without it boats that have got past the main part of the armament, even if crippled, may be able to destroy it.

Sentry lights show up a boat for too few seconds for any material effect to be expected from gun fire in connection with them; but when it is possible to have them at a considerable distance in front of the illuminated area a gun becomes a useful adjunct to the light in giving warning.

The use of the search-lights as fighting lights may sometimes enable medium guns, mounted for other purposes, to take

part in the anti-torpedo-boat defence, but it rests with the fire commander to decide whether the circumstances admit of it.

Captain A. E. C. Myers, R.G.A., in his Duncan Gold Medal Essay, 1905,[1] has clearly stated how the extent of the illuminated area affects the number of guns required, because the number of hits possible depends on the time the boats are under fire. He says: "Imagine a second-rate harbour, where it is desired to keep out a certain number of boats, and that X guns with Y lights are considered sufficient; but it is found that this entails too great expense, and that only half the guns and lights asked for are sanctioned. They won't keep out half the original number of torpedo-boats contemplated; for if there are only Y/2 lights, then to keep out the same number of torpedo-boats you want 2X guns; but instead of this you only have X/2 guns, and the value of the defence is quartered, although the guns and lights were only halved."[2]

The value of each gun depends on the length of its target's course in the illuminated area comprised in its arc of fire, and the number of hits considered necessary to disable a boat and the number of boats to be dealt with being given, the number of guns required will be that of which the united arcs of fire secure the time necessary for the hits to be made. Neither of the two *data* can be given with certainty, so a broad margin is indispensable.

Captain Myers, after carefully examining the results of peace practice and discounting such different conditions as war may produce, came to the conclusion that two hits may be counted on to disable a boat; that a 12-pounder Q.F gun can be expected to make four hits on a boat while it moves at an average speed of 24 knots through 1,000 yards of illuminated area, and that consequently one 12-pounder, with these conditions, may be reckoned on to knock out two boats.

This is open to doubt. With boats of the present size, the two hits must be very lucky ones to produce anything like complete disablement, and partial is not sufficient. A boat moving at 24 knots only takes 75 seconds to cover 1,000 yards, and in that time a change of target is impossible for the best trained and coolest gun-layer, as the disablement would not be apparent sufficiently quickly, and there must be certainty. Therefore Captain Myers' reliance on one gun to knock out one boat in an illuminated area having a depth of 600 yards seems a much safer working hypothesis. In many cases a deeper area is unattainable, though a depth of 1,000 yards does not give an extravagant margin.

"Garrison Artillery Training," 1905 (amended), enunciates the general principles of fire tactics as follows:—

"All boats must receive attention.

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[1] "Journal of the Royal Artillery," Vol. XXXII., No. 5.

[2] This, of course, assumes that no other arrangement of guns and lights than the one proposed is feasible.—R.F.J.

"It is of the greatest importance to disable the leading boat, and thus hamper the movement of the remainder, and thus cause moral effect by disabling the leader of the attack.

"Too many changes of target are to be avoided.

"Distribution may be by groups or single guns. Should the distribution be by groups, it should always be borne in mind that it may become necessary to distribute fire by single guns in order to engage all the targets that may appear in the illuminated area.

"The arrangements should be such that time is not wasted by guns being idle when boats are within their arcs of fire.

"Generally speaking, two guns are sufficient for one boat, and whenever correction of fire is necessary, not more than two should engage any one target. But under usual conditions, *i.e.*, guns fitted with auto-sights engaging targets within the short range of the illuminated area, the above restriction does not hold good."

It is generally acknowledged that it is impossible to indicate the targets to the gun-layers, and that they must be taught to select them in accordance with a previously prepared and practised scheme founded on the principles just given. Now, these, though all of them are sound, are not easy of simultaneous application, and there is a tendency to concentrate fire on the leading boat. This has its advocates, and is not an unnatural corollary of carrying out peace practice with single targets.

If the channel is so narrow that a disabled leader will certainly impede all its followers, the system is right; but if this is not the case, the moral effect is not likely to be great on officers and men who have undertaken such an enterprise, and there must be considerable chance of some of the rearward boats escaping attention. The system of concentrating fire on the leading boat does not meet the case of two or more boats or columns of boats moving abreast, and seems to be a blind reading of the principle of not wasting time, and, too, rather an acknowledgment of being unable to train the layers sufficiently to be sure of developing the full value of the guns. Time is not considered to be wasted if the supports of an infantry firing line do not use their rifles, and it is a waste of power to use more guns than are necessary.

The same principle should be applied as would be with any other force defending a position. The front—here the outer edge of the illuminated area—should be divided into sections, and a portion of the force—here the guns—told off to deal with the advance of the attack in each, while the remainder act as supports and come into action as required. There is no practical difficulty in applying this section system, and it is suitable for both channels and open approaches. It does, however, involve a certain amount of control of the light Q.F. batteries by the fire commander or a special officer, in order that guns may be directed on sections other than their own when desirable.

A group of two guns can very well be told off to deal with the leading boat in each section, but for the rest the principle of one gun to one boat is the best. The guns specially assigned to the defence of the boom can also act as a general reserve, and where there is no boom a group of two or three guns should if possible be reserved for the purpose.

The system of fire tactics, whatever it may be, should always be settled before the guns and electric lights are sited, and not left for subsequent consideration, as is perhaps generally done, because the fire tactics and siting are intimately connected, but simplicity in the former is far more important than any gunnery or engineering advantage possessed by particular sites.

To the factors influencing the choice of positions for the guns in a general way there may be added the facilities the locality affords for contracting, by means of breakwaters or temporary obstructions, the channels which the boats have to use, for the existence of such obstacles may much reduce the amount of armament required.

The characteristics to be sought for in the actual sites are:

1. *Shortness of Range.*—In "Garrison Artillery Training," 1905, 1,600 yards is given as about the outside limit at which fire should be opened at night, and as the cover of misty weather may also be used, there is no doubt that shortness of range is desirable. On the other hand, if the course of the target is across the arc of fire, the shorter the range the shorter the time under fire; and, as shown in Chapter III. (ii.), in the case of a 12-pounder Q.F. gun firing at a torpedo-boat from a site 50 feet above sea level, the trajectory is flatter and the permissible error larger at 1,000 yards than at less ranges. There is, therefore, a considerable margin, which can be used to enable other characteristics to be got.

2. *Height.*—Auto-sights are so indispensable for fighting guns at night that Captain Myers was well within the mark in saying: "Guns without auto-sights which are unavoidably mounted low down should only be reckoned at half the value of a gun with an auto-sight." To enable auto-sights to be used with 12-pounders at ranges up to 1,600 yards, a height of 40 feet is necessary, but a greater is desirable, because it is important to have the guns higher than the electric lights, and placed lower than this the lights will often be affected by the spray of the waves.

3. *Concealment.*—It is desirable that the positions of the guns shall not be known to the attack, or be easily recognisable, as some advantage may be gained by the surprise of unexpected fire; but an attempt to destroy the batteries by ships' fire as a preliminary measure to a torpedo-boat attack is improbable, because surprise is generally essential for the boats' success. Batteries on the sides of channels should never be so placed as to show up against the sky-line, or they may serve as the land marks the boats require for their safe navigation.

4. Command of the water area must be complete. Therefore, as a rule, the guns will have to be at no great distance from the shore line, or special ones will have to be added to the number normally necessary in order to cover otherwise dead water.

5. A wide arc of fire for each gun, so that the time at its disposal shall be as long as possible. This desideratum will often restrict the area available for sites, because to get wide arcs of fire without other works or property of the defence being made liable to damage is generally difficult unless the guns are placed near the inner edge of the illuminated area.

6. Concentration of the guns to facilitate their superintendence. This is desirable, but grouping, as usually understood, is not necessary, because the guns must be fought singly. On the other hand, the dispersion of the guns with greater intervals than are necessary to prevent confusion of orders in action has no tactical value.

In the construction of the emplacements there are two requirements that outweigh all others: an unimpeded field of view and facilities for the supply of ammunition. The batteries, even in exposed positions, are not likely to be attacked by ships, and the fire from the boats can have no appreciable effect, and should be prevented by the rifle and machine-gun fire of the infantry guards. In places where it may be possible for small parties to land in the neighbourhood and to reach the batteries with rifle fire, the gun detachments should be protected by a wall or other cover, for even a few volleys got in before the infantry guards can intervene may produce confusion at the critical moment. The emplacements should be thoroughly well lit, so as to reduce the difficulties of handling the guns and supplying ammunition by night, which is more important than concealment, though that need not be impaired if the lighting is arranged with a little care.

Gun shields are useful to give calmness to the men at the guns, but an unimpeded view to facilitate the selection of the target is so essential that shields should not be allowed to interfere with it.

The accommodation for officers and men must be close to the guns, and so arranged and of such a nature that, when they are called to action after long hours of weary waiting, their energy and readiness shall not have been impaired by either cold or avoidable fatigue.

Where the approaches to harbours are through land-bound channels, the variety in local conditions make it useless to try to arrive at any rule for the number of guns, but for the defence of an entrance through breakwaters, where the approach is open from any direction on an arc of about 180°, a rough estimate seems possible, if the basis of one 12-pounder gun being certain to knock out one boat in an illuminated area 600 yards deep is accepted.

According to the method of fire distribution advocated, the guns would be told off by divisions to sections of the arc through which the approach can be made. At first it may seem that the sections must be numerous, but such is not the case, because there are few, if any, entrances between breakwaters broad enough to admit more than three boats abreast, and to advance in a greater number of columns would entail too much risk of confusion and collision at the crisis of the enterprise. When the leading boats are disabled, the way on them may be expected to carry them to positions where the columns will not be far apart and where the disablement of two or three boats may be reckoned on to impede the others sufficiently to justify reliance on the guns being able to change their targets. Taking, then, one gun for each of the first three boats and an extra gun for the leader, four should be sufficient for each section, and twelve the maximum required for any entrance, exclusive of a group of two or three to defend the boom or to act as a general reserve. If the light guns are supported by medium, primarily mounted to deal with boom-smashers or blockers, the extra guns allowed for the leaders of columns may not be required.

The above views and deductions concerning the anti-torpedo-boat defence — the most difficult of all branches of harbour defence—are no doubt incomplete, and possibly incorrect, but the principle of one gun to one target is essential to the simplicity in tactics, which alone can ensure certainty of action.

### III.—*Medium Guns.*

If medium guns form part of the anti-torpedo-boat armament, all that has been said in connection with the tactics of the light guns applies. If, however, at ports of naval importance the same guns, as will usually be the case, are also required to deal with boom-smashers, blockers, or raiding vessels, the latter duties must be considered the more important, and the conditions they impose must be given the greater influence.

In all three cases the vessels should be stopped as far out as possible, and a ship may be expected to take more time to stop than a torpedo-boat. Therefore, the most advanced position possible for the guns should be adopted, and one on the flank of the ship's advance is advantageous as giving more chance of disabling her steering gear, which seems, perhaps, the quickest way of stopping one.

Even in blocking the ships are not likely to move abreast, because a disabled one may cause much confusion and make success still more doubtful than it usually is, and also because a channel broad enough for two ships must be difficult to block. It, therefore, seems sound policy to concentrate all fire on the leader, though there should be a pre-arranged plan for the distribution of fire when required.

The ranges will generally be too great for an illuminated area to be formed, and, consequently, "fighting lights" will

have to be used. These should be as few in number as the local conditions allow, but the danger of confusion, which makes them unsuitable for the anti-torpedo-boat defence, is lessened by the concentration of fire on one target.

Shortness of range, too, is not so important, because the targets are larger, and in the case of blockers, at any rate, the speed must be slow, as they have to become stationary before being sunk.

The length of the ranges and the use of fighting lights increase the desirability of height of sites for the guns, and the latter necessitates a very close connection in the working of the guns and lights, which it is difficult to obtain when they are in the hands of different corps.

In the defence of commercial harbours the prevention of bombardment is the first object; and, when this is the sole duty of the guns, the conditions governing their siting and use are the same as for heavy guns at ports of naval importance. Economy, however, will often be sufficient justification for adding the duty of preventing the attempts of blockers and raiding vessels, and a compromise in the matter of siting, etc., will be necessary. Of course, to enable the guns to meet the latter classes of attack, they must be provided with either an illuminated area or fighting lights, according to the local circumstances. As the batteries will be few, and the infantry garrisons small, the works should have some gorge defence against the attacks of small landed parties.

High-explosive common shell is the best projectile for medium guns for all purposes, but as obsolete cruisers may possibly be used as raiding vessels, a moderate proportion of armour-piercing shells may be useful.

"Raiding vessels" may be disguised cruisers, or merchant ships armed with guns or torpedoes, or filled with explosives, and their character cannot be recognised without a close examination. It is, therefore, necessary for all merchant-ships to be anchored for the purpose of examination while they are still outside, or in an area commanded by a sufficient number of medium guns to ensure their being stopped, if they attempt to evade examination. If there is no suitable anchorage under the fire of the armament mounted to meet other forms of attack a special equipment of guns must be given, and if no defended "examination anchorage" can be provided, all commercial traffic must be suspended when the weather prevents examination outside. It is, of course, desirable to interfere as little as possible with commercial traffic, and it rests with the Naval Authorities to decide when an examination service shall be put in operation, and whether they will undertake the examination, or leave it in the hands of the fortress commander. The examination service consists of the vessel, or vessels, used for boarding, and of the guns told off to support the vessel, and to enforce observance of the regulations, together with their officers and men.

The service is always expensive in officers and men, and sometimes in material, so it is always a matter for careful consideration how the end may be attained with the least amount of inconvenience to all concerned, and, if commercial interests prevent the port being closed, whether the damage that may be received from raiding vessels is sufficient justification. An inefficient examination service is worse than none, for its inefficiency cannot be concealed, however much secrecy is observed as to its detailed arrangements.

## IV.—*Adjuncts to the Guns.*

### Electric Lights.

Objection has sometimes been taken to the employment of electric lights on the score of their apparent vulnerability, and the possible help they may give in the navigation of the channels of approach; and there are at some places certain exceptional conditions which may make it advisable to refrain from their use occasionally; but the fact remains that without lights all gun fire is ineffective during the hours of darkness; and peace manœuvres tend to show that in some circumstances the lights themselves may ward off an attack by their blinding effect on the navigators.

In a report of a Board of Engineers, quoted in a paper on "Coast Defence" in the "Journal of the United States Artillery,"[1] it is stated that a 60-inch light may be effective up to between 6,000 and 8,000 yards, and a 36-inch one up to between 4,000 and 6,000 yards; but in "Garrison Artillery Training, 1905" (revised), we are told:—"Experience has shown that the effective range of various lights, as regards the laying of the guns, would, on an ordinary night, without fog, on British coasts, be approximately as follows:—

| | | | |
|---|---|---|---|
| A concentrated beam | ... | ... | 2,000 yards. |
| A 16 degrees dispersed beam | | ... | 1,500 ,, |
| A 30 ,, ,, ,, | | ... | 1,200 ,, |
| A 45 ,, ,, ,, | | ... | 900 ,, |

"The light in each case is assumed to be near the sea level, and the observer about 50 feet above, and close to the light.

"For purposes of observation only, the range of the lights will be about 50 per cent. longer than the above."

In some climates, such as that of Gibraltar, the range for observation may reach, and sometimes even exceed, the American estimate, but our figures form a much safer basis for the plans of fortification.

The number of lights required depends on local conditions, such as the form and breadth of the channels and the time the

[1] Vol. XXII., p. 247.

boats have to be illuminated to enable the guns provided to deal effectively with the scale of attack laid down as probable. No estimate can, therefore, be made for general application.

A single isolated light should never be installed, and in all cases a surplus number must be allowed, and so arranged that the periodical changing of carbons and other casualties shall not involve periods, however short, of inefficient illumination. This requirement also necessitates some reserve engine power for each group of lights, or the provision of accumulators.

In the British service, up to quite a recent date, the guns were only assisted by fixed beams, and as electric plant was used in connection with the mine-fields, there were advantages in the lights being worked by the corps in charge of the mines. Now the lights are purely adjuncts to the guns, and the use of fighting lights cannot well be perfected unless the working of the guns and lights is in the hands of a single corps.

This relation of lights to guns has to a certain extent been recognised, and in the last revision of our training manual it is laid down that the lights "should usually be controlled by the artillery officer (whether fire or battery commander), who is responsible for the artillery control over the area covered by them." But control is not sufficient, because it cannot be efficiently exercised without the intimate knowledge that can only be possessed by those concerned in the detail of the working, or without direct command of the workers.

The only argument for having these adjuncts, unlike all others, worked by engineers instead of artillerymen worthy of any consideration is, that all the trained men belong to the former, and that the work gives employment in peace to officers and men who will be useful for other duties in war. It is, of course, a matter of general policy that, perhaps, it would be out of place to discuss further here, but it is one to which reference is unavoidable in any consideration of harbour defence.

### Ranging Adjuncts.

1. Position finders, in enabling fire to be directed on targets invisible from the guns, may sometimes lessen the number of guns required, and are sometimes necessary to enable guns to be used when their field of fire is obscured by the smoke of shells burst in front of them, or when those on high sites are enveloped in cloud.

As range finders they are always necessary for heavy guns, because the fight will generally take place, and always begin, at ranges too great for auto-sights, and requiring great accuracy in measurement.

The nature of the duties of medium guns, except such as are mounted to protect commercial harbours from bombardment, render their use with them unnecessary, and the conditions attaching to the action of anti-torpedo-boat guns preclude it.

2. Range-finders, in that they only measure the range from themselves, and not from the guns, cannot be used in positions at any distance from the latter, and so cannot extend the area commanded or neutralise the effect of smoke or cloud. Their accuracy is less than that of position finders, but they are, of course, much cheaper, and their accuracy is good enough for their use with medium guns at the less important commercial ports, when position finders are not wanted to extend the area of fire.

3. Range dials should be electrical, as those worked by hand, especially when more than one has to be used, introduce chances of personal error that the most careful training cannot entirely eliminate, and cause delays in transmission that cannot be regulated sufficiently to ensure certain shooting.

4. Observation posts properly and fully equipped with electrical communication with the gun emplacements, should always be provided for all guns mounted to prevent bombardment, if the topographical conditions give facilities for the observation of fire from a flank, because accurate observation of the fall of projectiles at long ranges is practically impossible from any position near the gun. The position finding cells or the fire commander's post are often sufficient, but not always so, and not to utilise fully the opportunities, afforded by the shore line, is to give up one of the greatest advantages possessed by batteries over ships.

## Means of Communication.

Telephones are necessary for the communication of information and orders, for all means of visual signalling are too slow for artillery purposes with modern ordnance and modern ships as targets. The anti-torpedo-boat defence must have bells in every battery connected with the look-out post, or posts, for the purpose of rapid warning; but these should be supplemented with telephones, so that mistakes can be corrected, or explanations asked for and given. As a rule all the lines that will be used for conveying orders during an action must, to avoid delay, be independent, *e.g.*, a fire commander must have a separate line to each of his battery commanders; exchanges are inadmissible.

The cost of all the adjuncts, which secure accuracy and rapidity of action, is very small compared to that of the works and armament, and it is the falsest of economies to stint the provision of them.

Experts will doubtless note many omissions in the above summary of the tactics connected with the defence of harbours against the attacks of ships and torpedo craft, but an attempt has been made to confine it to those points which should be known to sailors and soldiers, who may be called on to design defences, and to the politicians and public, who have to find the money.

*(To be continued.)*

# THE VON LÖBELL ANNUAL REPORTS ON MILITARY MATTERS IN 1907.

*Précis from the German by Lieut.-Colonel* E. GUNTER, *p.s.c., late East Lancashire Regiment.*

## PREFACE.

THE addition this year of some photographs at the end of the volume showing the equipment of soldiers of various nationalities, of Air-ships, and of some Field and Heavy Artillery (among which the British are conspicuous) increases the interest of this valuable compilation of statistics regarding the armies of European and some other States. In Part II. notes on Heavy Artillery are included. The Reports on Machine Guns are now kept separate from those on Small-arms. A short article on the revised Geneva Convention is also given. Special attention has been bestowed on Military Literature.

The Editorial Staff deeply deplore the death of a fellow-worker for many years, Major von Bruchhausen, whose reports on the Italian Army always attracted much attention, and they will always remember him with honour.

The Report contains 477 pages, as against 509 in 1906. In Part I. reports of the Forces of the Argentine, Brazilian, Uruguay, and United States Republics are given, while that on Japan is omitted this year. The other Armies are treated of at the same length as usual. Part II. is 22 pages longer. Part III., which deals with German Colonial war, is 26 pages shorter.

## PART I.

### ORGANISATION.

### AUSTRIA-HUNGARY.

The strength and distribution of the Austro-Hungarian Army are nearly as previously reported† There is a slight increase in the total peace strength, it being in 1907, exclusive of Medical and Pay Officers:

| — | Officers. | N.C.O. and Men. | |
|---|---|---|---|
| Regular Forces ... ... | 15,040 | 288,361 | With 1,048 guns. |
| Austrian Landwehr ... | 2,738 | 33,545 | |
| Hungarian „ ... | 2,298 | 24,596 | |

The strength of Units was as reported last year for 1906.††

The official language, including words of command, is, for the Regular Forces and Austrian Landwehr—German. For the Hungarian Forces and Hungarian Landwehr—Hungarian. And in certain Regiments, Croatian is used.

†In the JOURNAL for October, 1903, p. 1117 (Table).—E.G.

††In the JOURNAL for October, 1907, p. 1249. The number of men in a squadron to read 166, instead of 116, as printed.—E.G.

Universal and compulsory service is regulated by the law of 1889, and commences about October of the recruits' twenty-first year, and lasts for three years with the colours and for seven in the Army Reserve; total, ten. Then for two years in the Landwehr. After that he is liable, until he is 43, to serve in the Landsturm or General Levy. Recruits passed at once into the Landsturm are liable to serve on emergency from their nineteenth to their forty-second year. Men are also enlisted for the Landwehr direct, in which they serve only two years, passing then for ten years into the Landsturm.

The military taxation law was slightly altered in 1907. Besides the tax levied on men found unfit, etc., for service, which varies according to their income from 5s. 6d. a year to £2 6s., the parents who have an income of over 4,000 krone (about £166) a year have to pay half the amount their sons exempted from service as above pay. In the case of emigrants, the tax for the whole twelve years in which he is liable for service must be paid in advance before permission to emigrate is granted him.

The Archduke Frederick of Austria was appointed Commander-in-Chief of the Austrian Landwehr.

Lieut.-Field-Marshal v. Georgi was appointed Defence Minister.

Quartermaster-General Baron Albori was appointed Inspector-General of the Forces.

## BELGIUM.

The strength and stations of the Belgian Army remain as reported in the JOURNAL for November, 1905.

**Military Education.**—On the 15th April, 1907, new regulations for the Infantry Regimental Schools and courses of instruction were issued. These are for the preparation of candidates for appointment as corporals and under officers, and for entrance into the War Schools. Each Regimental School forms a company in three divisions for practical military instruction, and for theoretical instruction six divisions are formed. The course is similar to that of the elementary and intermediate civil schools, and includes that for the preparation of sub-lieutenants. Special instruction is given in moral duties, discipline, formation of character, etc., and also in accounts and in subjects which facilitate entrance into Civil Services. All "illiterates" are obliged to attend the reading and writing classes. The courses for the students at the War School were laid down in the orders of the 24th April. In their first year they are to visit and study fortresses, artillery workshops, and industrial factories, and make compass sketches; in the second year, visit and study battlefields and have further practice in field sketching; in the third year they have special exercises in engineering and fortification, military topography, staff rides, combined tactical staff exercises, and field fortification exercises, with railway schemes, etc.

Lieut.-General Comsebant d'Alkemade, Minister for War, took his retirement in 1907, after being a Member of the Cabinet for eight years. Though he did not succeed in getting the peace establishments brought up to the strength and stability he desired, he increased the war strength and efficiency; he had the fortifications of Antwerp extended and improved, and introduced many useful reforms, and the general spirit of economy and order with which he infused the War Department were of great value. His successor, Lieut.-General Hellebant, has a great reputation, especially for artillery knowledge, and his appointment is popular in the Belgian Army. He may have to face the recruiting question. The attempt to increase the proportion of volunteers in the Army does not promise success.†

## FRANCE IN 1907.

As foretold in last year's Report,‡ the two years' service enrolments were completed last year by the inclusion of the 1906 contingents. The next few years will show whether the Army Enlistment Act of the 21st March, 1905,††† is a success or not. It is, however, already evident that the training of the Cavalry and Horse Artillery will be impossible unless the former three years' service men can be replaced by re-engaged men or volunteers for long service. Hitherto this has not been the case owing to the diminished material advantages offered and the increasing dislike to military service.§ On the 30th November, 1907, the law regulating the cadres was issued. It contains many important changes in organisation, among which the increase in Field Artillery is the most noticeable. No preparations have yet been made for the issue of a new rifle, owing to the more pressing demands for more Artillery and Machine Guns. There can be little doubt, however, that the authorities have succeeded in devising an automatic repeating rifle. During the year 1908 we shall probably see many changes in the organisation of the French Army.

The efforts made by many officers, and especially by General Langlois, to get the numbers of Cyclist Troops increased have not been as yet successful. It is considered by many that Machine Gun Detachments take up less room on the line of march and can follow the Cavalry better. It is intended that each Infantry Battalion shall be provided with two Machine Guns and each Cavalry Brigade a section of two Cavalry Machine Guns.

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†The Belgian Army is recruited partly by voluntary enlistment and partly by conscription.—E.G.

‡See the JOURNAL for October, 1907, p. 1251.—E.G.

†††See the JOURNAL for October, 1906, p. 1225, for details.—E.G.

§For recruiting, etc., statistics, see the JOURNAL for February 1908, Military Notes, pp. 270, 271.—E.G.

TABLE showing in brief stations and approximate strength of the FRENCH ARMY in 1907, compiled from *Von Löbell's Tahresberichte, 1907.*

| Army Corps No. | Region Hd-qrs. | Infantry. Divisions * with Nos. | Brigades. | Regts. | Batns. | Cavalry. Brig. | Regts. | Sqdns. | Field Artillery. Brigades. | Regts. | H.A.B. | F.A.B. | Mn. B. | Gar. Art. Batns. | Cos. | Engrs.† Batns. | Cos. | Train. Batns. | Cos. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. | Lille ... ... | 1-2 | 4 | 9 | 28[1] | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | 2 | 4 | 1 | 4 | 1 | 3 |
| II. | Amiens ... ... | 3-4 | 4 | 8 | 25[2] | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | — | — | 1 | 2 | 1 | 3 |
| III. | Rouen ... ... | 5-6 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | 1 | 4 | 1 | 2 | 1 | 3 |
| IV. | Le Mans ... ... | 7-8 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | — | — | 1 | 4 | 1 | 3 |
| V. | Orleans ... ... | 9-10 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 24 | — | — | — | — | — | 1 | 3 |
| VI. | Châlons, S.M. | 12-40 42 | 6 | 12 | 53[3] | 2 | 4 | 20 | 1 | 2 | 2 | 24 | — | 2 | 15 | 1 | 4 | 1 | 3 |
| VII. | Besançon... | 13-14 41 | 6 | 10 | 45[4] | 1 | 3 | 15 | 1 | 2 | 2 | 27 | — | 4 | 16 | 1 | 6 | 1 | 3 |
| VIII. | Bourges ... ... | 15-16 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | — | — | 1 | 3 | 1 | 3 |
| IX. | Tours ... ... | 17-18 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 24 | — | — | — | 1 | 4 | 1 | 3 |
| X. | Rennes ... ... | 19-20 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 23 | — | 1 | 6 | 1 | 4 | 1 | 3 |
| XI. | Nantes .. ... | 21-22 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | 1 | 7 | 1 | 4 | 1 | 3 |
| XII. | Limoges ... ... | 23-24 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | — | — | 1 | 3 | 1 | 3 |
| XIII. | Clermont-Ferrand | 25-26 | 4 | 8 | 21 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | — | — | 1 | 3 | 1 | 3 |
| XIV. | Lyons ... ... | 27-28 | 5 | 9 | 35[5] | 1 | 2 | 10 | 1 | 2 | — | 21 | 8 | 1 | 12 | 1 | 5 | 1 | 3 |
| XV. | Marseilles ... | 29-30 | 4 | 9 | 36[6] | 1 | 2 | 10 | 1 | 2 | — | 18 | 6 | 3 | 17 | 1 | 4 | 1 | 3 |
| XVI. | Montpeiller ... | 31-32 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | — | — | 1 | 3 | 1 | 3 |
| XVII. | Toulouse ... ... | 33-34 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | — | — | 1 | 3 | 1 | 3 |
| XVIII. | Bordeaux ... | 35-36 | 4 | 8 | 24 | 1 | 2 | 10 | 1 | 2 | 2 | 21 | — | 1 | 6 | 1 | 3 | 1 | 3 |
| XIX. | Algeria-Tunis[7] | 37-38 2 Terr | 6 | 10 | 61 | 4 | 10 | 50 | — | — | — | 15 | — | 2 | 8 | 2 | 10 | — | 12 |
| XX. | Nancy ... ... | 11-39 | 4 | 8 | 37[8] | 1 | 3 | 15 | 1 | 2 | — | 24 | — | 2 | 11 | 1 | 4 | — | — |
| | Mil. Govt., Paris | — | — | — | 3[9] | — | — | — | 1 | 2 | 4 | 13 | — | — | 3 | 4 | 22[10] | 2 | 6 |
| | ,, ,, Lyon | — | — | 2 | 13 | — | — | — | — | — | — | 2 | — | — | — | — | — | — | — |
| Colonial | Paris[11] .. ... | 1-2-3 | 6 | 12 | 36 | — | — | — | 1 | 3 | — | 14 | — | — | 18 | — | — | — | — |

† The Engineer Batns. are grouped in Regiments, and excepting in the VI., VII., and XX. Army Corps are not under the Corps Comdrs.

REMARKS.

* Infantry Divisions are numbered successively throughout the Army.

1 Including 1 Bn. Rifles.
2 ,, ,, ,,
3 Including 5 Bns. Rifles.
4 ,, ,, ,,
5 Including 7 Bns. Rifles.
6 ,, 5 ,,
7 3 Divns. in Algiers, Oran, and Constantine. The Tunis Divn. is under an independent Comdr.
8 Including 5 Bns. Rifles.
9 ,, 1 Bn. ,,
10 12 Ry., 6 Tel. and 4 Balloon Cos.
11 2nd Col. Divn., Hdqrs., Toulon. 3rd ,, ,, Brest.

There are no important changes to bring to notice in the organisation or strength of the eight Cavalry (permanent) Divisions or in the other troops. These were fully detailed in last year's Report,† except that all the Infantry Regiments, which are incorporated in the Divisions, have lost their 4th Battalions where these existed. 44 whole and 22 half battalions have been disbanded or broken up. This has enabled the existing Battalions to be brought up to their establishments, and has provided men who can be utilised in the increase of the Field Artillery.††

APPROXIMATE STRENGTH OF UNITS IN PEACE AND WAR.

| Unit. | In Peace. | | | | | | | In War. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. of Units | Officers. | N.C.O. R. and F. | Horses. | Guns. | Am. Wagons. | Other Carriages. | Officers. | N.C.O. R. and F. | Horses. | Guns. | Amn. Wagons. | Other Carriages. |
| Infantry Batn. ... | 564 | 14 | 502 | 6 | — | — | — | 19 | 1,009 | 21 | — | — | 7 |
| Rifle Bn. (6 Cos.) | 18 | 33 | 818 | 10 | — | — | — | 29 | 1,534 | 48 | — | — | 17 |
| Alpine Bn. (6 Cos.) | 12 | 34 | 934 | 56 | — | — | — | 31 | 1,540 | 141 | — | — | 16 |
| Zouave Bn. ... | 20 | 14 | 594 | 7 | — | — | — | § | § | § | — | — | — |
| Turko Bn.... ... | 26 | — | — | — | — | — | — | § | § | § | — | — | — |
| Sqdn. of Cavalry | 425 | 6 | 150 | 141 | — | — | — | 5 | 160 | 160 | — | — | 1 |
| ,, Spahis ... | 20 | 6 | 178 | 183 | — | — | — | — | — | — | — | — | — |
| Field Art. Batt. .. | 453 | 5 | 103 | 61 | 4 | 2 | — | 4 | 170 | 168 | 4 | 12 | 6 |
| H. Art. Batt. ... | 52 | 5 | 105 | 87 | 4 | 2 | — | 4 | 170 | 210 | 4 | 12 | 7 |
| Mountain Batt. ... | 20 | 5 | 156 | 96 | 6 | 3 | — | 5 | 200 | 99 | — | — | 3 |
| Garrison Batt. ... | 109 | 4 | 129 | 4 | — | — | — | — | — | — | — | — | — |
| Engineers Co. ... | 101 | 4 | 108 | 1 | — | — | — | 4 | 252 | 24 | — | — | 5 |
| Cyclist Co. ... | 5 | 4 | 120 | — | — | — | — | 4 | 175 | — | — | — | — |

REMARKS.—The No. of Units that might be forthcoming in War is unknown. The total strength of Officers in Peace averaged 30,823, and men 585,000 inclusive of the Colonial Army Corps in France.

**The New Law Regulating the Cadres.**—The new law (30/11/07) which introduced the two years' service system had the effect of reducing the number of men with the colours in peace time and of increasing the value of the officers and men of the Reserves, etc. For the next few years the average peace strength of the Army might be taken as 534,000 men. The saving made in this would enable the Artillery and Engineers to be strengthened. The actual strengths are kept closer up to the establishments. The increase in Artillery brings the number of guns in an Army Corps equal to that of the German.

†See the JOURNAL for October, 1907, pp. 1251, 1252.—E.G.

††The composition of the Cavalry Divisions is altered. 6 out of the 8 Cavalry Divisions have 1 Cuirassier Brigade each. Formerly there were 4 Heavy Cavalry and 4 Light Cavalry Divisions. The Cavalry Divisions in war are to consist of 2 or 3 Cavalry Brigades of 2 or 3 Regiments Cavalry, and 2 Horse Artillery Batteries, Telegraph, etc., Detachments.

§Not given in Table.—E.G.

**Army Reserves.**†—145 Regiments of Army Reservists are to be formed, and from these Reserve Divisions organised. Probably each Army Corps will have its Reserve Division.

**Territorial Army.**†—There are now six annual contingents of Territorials and six of the Territorial Reserve available for war. These will allow of 145 Territorial Regiments, each of three Battalions, being formed.

The Army Reservists are required to train for 28 days, and are generally called out to train with their Corps in manœuvres, and the Territorials for 14 days. Efforts are being made in Parliament to get these periods reduced. The matter is still under consideration.

**Discipline.**—The report still dwells upon the want of discipline in the French Army, and especially among the Army Reservists and Territorials. This was especially noticeable in the Corps on the eastern frontier, where the best troops of the French Army are stationed. It says anti-militarism is pervading the ranks of the officers of the Reserve. A Socialist professor in a University is said to have declined as an officer of the Reserve to carry a colour on parade, etc. The best affected organs of the Press are warning the public of the inevitable consequences of this, and are strongly supported by the Government in so doing.

**Field Kitchens.**—Portable field kitchens for companies at war strength on 4-wheeled carriages drawn by two horses were successfully tried in Nancy and Grenoble.

**New Regulations.**—"*Instruction pratique sur les travaux de campagne*" (Infantry), issued 24th October, 1906; also "*Vade mecum de l'officier de l'Etat-major en campagne*" (Lavauzelle Paris).

**Equipment.**—Nothing has been decided further than reported last year about the lightening of the knapsack. Trials are still being carried on, however. It seems probable that a sort of "*Rücksack*" will be adopted to carry essentials, the rest being carried in canvas kit-bags in the company wagons. Repeated experiments are being made with portable entrenching tools.

**Manœuvres in 1907.**—The XIIth and the XVIIIth Army Corps manœuvred in the country south of Angoulême, under General Millet's supervision, between the 12th and 21st September. The Ist and VIIth Corps held 10 days' manœuvres, with Cavalry Divisions attached. Manœuvres lasting 14 days were also carried out in seven other Army Corps. The 2nd and 8th Cavalry Divisions held 8 days' great manœuvres west of Epinal, and altogether six out of the eight Cavalry Divisions manœuvred on a larger or smaller scale.

†See the Report for 1906, in the JOURNAL for October, 1907, p. 1252.

## GERMANY.

The organisation and strength of the German Army remain much as they were when the law regulating these was passed on the 15th April, 1905.

An epitomised tabular statement showing stations and distribution was published in the JOURNAL for October, 1906, p. 1258.†

The chief units in peace are: 19 German and 3 Bavarian Corps, including 1 Cavalry and 48 Infantry Divisions, 47 Cavalry and 106 Infantry Brigades = 630 Battalions, 494 Squadrons; 17 Brigades of Horse Artillery, 182 of Field Artillery, which include 42 Horse Artillery Batteries, 532 Field Artillery Batteries, 18 Regiments of Garrison Artillery = 165 Companies; 27 Battalions Engineers = 106 Companies; besides Railway, Telegraph, and Balloon Battalions and Companies; also 23 Battalions = 68 Companies Train. The peace strength of the Units remains practically as before (p. 1257, October, 1906). The Balloon Battalion, with its detachment, numbers 17 officers, 312 non-commissioned officers and men. No war establishments are published.

To complete the peace establishments sanctioned for 1910 (for details see the JOURNAL, June, 1905, pp. 721-2-3) there are still wanting 16 Squadrons, 3 Battalions, and 2 Battalions of Engineers.

As so much interest is now taken in the German terms of service, these are again epitomised as under:—

**Terms of Service.**—From the completion of his 17th to that of his 45th year, every healthy German†† is liable to serve in the Regular Forces, Militia (Landwehr), or General Levy (Landsturm). From his (completed) 20th year until 31st March of his 39th year he serves in the Regular Cavalry or Infantry, Active Reserve and Landwehr 7 years. The service with the colours is: for Cavalry and Horse Artillery, 3 years; others 2 years.§ In the case of non-combatants, such as the Train, this is often reduced to 1 year. Then all enter on service in the Active Reserve to complete the 7 years. Thereon in the 1st Ban of the Landwehr, Cavalry and Horse Artillery—3 years; others 5 years. In the 2nd Ban, Cavalry who have put in 4 years—3 years; others to end of service. After this, in the 2nd Ban of the Landsturm till freed by age as above.

In the 1st Ban of the Landsturm, all enter who, for one cause or another, have not served in the Regular Army or the "*Ersatz*" or Substitutes' Reserve. The latter Reserve is formed from the overflow of the annual contingent; men enrolled in it are *liable* to serve for 12 years, *i.e.*, from the 20th (completed)

†By a misprint or slip, the I. Corps (Königsberg) was shown in this as having 1 Division instead of 3 Infantry Divisions. It has 37 Battalions and 30 Squadrons.—E.G.

††The minimum height for service in the Active Army is 5 feet 2½ inches.—E.G.

§For details regarding 2 years' service, see the JOURNAL, June, 1905, pp. 721-3.

year inclusive. Then they are divided into two classes. Those trained then enter the 2nd Ban of the Landwehr, to which they form a Reserve; those untrained, the 2nd Ban of the Landsturm. Men may *volunteer* for two years (Cavalry four years') service in a particular Regiment, Battery, or Battalion from their 17th to 19th year. After 30 years of age the Landwehr service of these men ceases. The one-year volunteers, who support themselves, must have passed certain examinations, serve for a year, and then, if found fit in every respect, are appointed officers of Reserve and Landwehr. They must enrol between 17 and 20.

**Training, Mustering, etc.**—Reservists are liable to be mustered twice in each year and for two trainings, each lasting two months, during their period of Reserve service. The 1st Ban of the Landwehr are liable to be mustered once in each year and to be called out for two trainings, lasting from eight to fourteen days. The Ersatz Reservists are liable to an annual muster and to three trainings, lasting respectively ten, six, and four weeks.

**Recruiting Statistics in 1907.**—These were fully detailed in the JOURNAL for February, 1908, pp. 273-4, Military Notes, so there is no need to repeat them. About 57 per cent. of those who came forward for physical examination were found fit, but after deducting unfits, etc., out of 1,145,386, it was not found necessary to enlist in the Regular Army 207,935 and in the Navy 8,902.

## GREAT BRITAIN.

The Report of the Reorganisation of the British Army in 1907-8 is given in great detail with tabular statements of war strengths, the expeditionary force, strength of units, etc., and covers 23 closely-printed pages of the book, with copious explanatory notes. Such details as the grant of 3d. a day grocery money to recruits, as well as older soldiers, and the new field cap, are gone into, and the Army Estimates are closely examined. As regards these, the Report calculates that the expenditure per head of the population in England on the Army was about fourteen shillings, as against ten shillings in Germany and seventeen shillings in France. The renewed proposals, which it is said chiefly found advocates in France, for the construction of the Channel Tunnel and their rejection by the general feeling of the country, as well as by military opinion in England, are noticed. The Report draws attention to the very full accounts of the Reorganisation of the British Army, given in the *Revue Militaire* and in the *Militär-Wochenblatt* in 1906.†

## JAPAN.††

†The industry of German officers in acquiring minute knowledge of our organisation and tactics might well be emulated by our officers in regard to foreign Armies.—E.G.

††As mentioned in the Preface, there was no Report last year on Japan, but full details of organisation, etc., were given in last year's JOURNAL, October, 1907, pp. 1257-60—see also the JOURNAL, June, 1905, pp. 725-6.

## RUSSIA.

The Report contains, as usual, voluminous tabular statements showing the stations, distribution, and strength of the Russian Army, which it is of course impossible to reproduce or even to epitomise.† It confesses that it is impracticable to give exact numbers of even the peace establishments. The War Minister in fixing the contingents of recruits in the spring of 1907, indicated the peace strength as about 1,254,000, of which 200,000 were in Eastern Asia, 50,000 in Central Asia, and 1,000,000 in Europe. Including Reserves, the European Army may be estimated at 2,000,000, the East Asian at 300,000, the Central Asian at 90,000. In addition there are 260,000 garrisoning fortresses, 300,000 Erzatz Reserves, and 700,000 opoltchénie (Territorial Militia). The projected reduction of the period of service with the colours was carried out in 1907, and the Active Reserve divided into two classes. Exemptions from compulsory service on account of family or property affairs have become in peace time very numerous. Educational tests have been established for Volunteers. Clergy, medical men, and teachers are exempt from service on the active list. The War Minister can reduce the period of service to one year.††

The Report gives on p. 195 a most complicated table purporting to show the different periods of service in the various categories. Officers interested in conundrums may study it in the original, which also refers readers for further details to the 20th and 21st Editions of the *Emteilung und Dislocation der Russischen Armee," von Major v. Carlowitz-Maxen. Zuckschwerdt Co., Leipzig.*

**Transport, etc.**—Improvements have been made in the organisation of the Regimental, etc., Transport. Part of the entrenching tools hitherto carried in the Divisional Train are now carried in the Regimental wagons. Each Regiment of four Battalions has 16 one-horsed ammunition carts and 8 two-horsed ammunition wagons. There are 21 one-horsed baggage carts, 23 two-horsed provision wagons, 17 two-horsed travelling field kitchens, and 4 four-horsed ambulance wagons in the Regimental Train. Cavalry Regiments now carry their explosive equipment on one pack-horse. Each Squadron has a baggage wagon and a field-kitchen. Each Infantry Company has 1 baggage cart, 1 provision wagon, and 1 field-kitchen, each Battalion 1 officers' baggage cart; the rest are in the Regimental Train as above. In the first line transport are 8 one-horsed ammunition carts, the whole of the ambulance, the field-kitchens, and the officers' baggage wagons. All other vehicles are in the second line transport. This is divided into four sections.

†The general organisation by military Districts remains much as it was in 1898—see the JOURNAL, March, 1898, p. 299.—E.G.

††The old periods of ordinary service were from the age of 21 to 43—5 years with the colours, 13 in Active Reserve, then the remainder in the Opoltchénie (Territorial Militia). For recruiting, educational, etc., statistics for 1907, refer to the JOURNAL for July, 1908, p. 988, 989.

The Division Train has two moveable field ambulances and a field hospital. The Army Service Transport Train carries entrenching tools, clothing, and 22 pairs of new boots for each Company and Battery. The Remount Depôt of five horses for each Cavalry Regiment and Battery of Artillery marches with this. The rationed strength of a normal Army Corps in the field of two Infantry and one Cavalry Division may be taken as 40,000 men and 16,000 horses. The weight carried by the Infantry soldiers on the march, inclusive of uniform, etc., has now been fixed at 57 lbs. in winter and 53 lbs. in summer.

**Discipline.**—The Russian Army has remained faithful to the Czar throughout the trying occurrences of the past year. It may be looked upon, therefore, as thoroughly loyal and trustworthy. Isolated local cases of mutiny and excesses certainly did occur, but these were promptly suppressed because they were energetically handled. The Report mentions the trial of General Stoessel and his colleagues, but the final result was not known when the Report was in the press. It blames the indiscretion of the English Press in publishing certain strictures of General Kuropatkin in his secret, self-justificatory report. It characterises the book by General Martynor, called "The Causes of the Russian Defeats," as one which cannot be described as gratifying to Russian officers on account of its extreme and exaggerated strictures, though written in an attractive style and by an honest patriot.*

## SWITZERLAND.

The new Military Law passed on the 12th April, 1907, regulating the system of Universal Training in Switzerland was, after reference to the Swiss nation, accepted by a majority of votes on the 3rd November, 1907. The periods of training, duration of liability, exemptions, and amount of the military tax payable by men who are exempted, and their parents, etc., were all detailed in the admirable lecture given in the R.U.S.I. Theatre on the 7th November last by Lieut.-Colonel Delmé-Radcliffe, C.M.G., M.V.O., *p.s.c.*, and published in the JOURNAL for December, 1907, p. 1466. In this he ably contrasted the military and moral advantages of universal obligatory training to a nation, with that which is purely voluntary, while he showed the thoroughness of the Swiss recruits' training of 65 continuous days, compared to the few intermittent hours which those of our Territorial Army are subject to. He laid stress upon the intensely patriotic spirit of the people which made light of the inconvenience the liability of all to military training caused, and showed in detail the great efficiency attained by a sound system of universal training systematically carried out.

The von Löbell Report gives a short table showing the Swiss Forces as under, 1st January, 1907.

*Translated into German by Lieutenant v. Schwarz. K. Siegesmund. Berlin. 2.50 marks.

TABLE SHOWING IN BRIEF THE APPROXIMATE STRENGTH OF THE SWISS ARMY IN 1907.

| — | Infantry. | | | | | Cavalry. | | | | | Artillery. | | | | Engineers. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A. Corps. | Divns. | Brigades. | Regts. | Batns. | Brigades. | Regts. | Sqdns. | Cos. Guides. | Machine gun Cos. | Regts. | Brigades. | F. Art. Batts. | Park Cos. | Half Batns. | Bridge Detachments. | Tel. Cos. | Field Hos. | A. Service Corps. |
| Elite ... | 4 | 8 | 16 | 32 | 103[1] | 4 | 6 | 24 | 12[3] | 4 | 12 | 24 | 72 | 24 | 8 | 4 | 4 | 12 | 4 |
| 1st Class Landwehr | — | — | 4 | 9 | 31[2] | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | |
|---|---|---|---|---|
| Total Rationed Strength— | | | | |
| Elite ... ... 104,263 | 5,183 | 18,544 | 5,567 | 204 1,466 |
| 1st Landwehr 42,609 } | 4,378 | 11,258 | 1,771 | 1,771 896 |
| 2nd Landwehr 25,346 } | | | | |
| Total Inf.... 172,218 | Tot. C. 9,561 | Tot. A. 29,802 | Tot. E. — | — 2,362 |
| Grand Total ... ... ... ... 232,677 | | | | |

[1] Including 8 Rifle Batns. outside Regtl. Cadres.
[2] " 4 " " "
[3] 2 Cos. at disposal of Hd.-Qr. Staff.

For the defence of the Forts of St. Gothard and St. Maurice there are also in each one Regiment of Infantry and one Landwehr Regiment, besides Fortress and Position Artillery Batteries and Companies of Engineers, etc. There are also six Mountain Batteries, Bridging and Balloon Companies, Telegraph Company (Engineers), Railway Companies, Ambulance and second-class Landwehr (31 Battalions). The Field and Mountain Batteries have four Krupp barrel-recoiling Q.F. guns each.

**Recruiting.**—In 1907 32,061 men became liable for training; of these 11,708 were pronounced unfit (36.5 per cent.), 4,217 were put back (13.25 per cent.), 15,536 were taken for training. Owing to the former very strict tests insisted on by the medical officers, the number of men taken for training has fallen off during the last five years, so instructions have been given to make the tests less severe in cases of young men who are eager to be trained, should they be deemed likely to become efficient later on.

**Equipment.**—No change has been made in the equipment of the ordinary Infantry, though experiments with new patterns, etc., have been carried out; but for officers and men employed in the mountains a special "Mountain Equipment," including ice axes, alpenstocks, putties, snow spectacles, gloves, caps, lanterns, and other necessaries for Alpine climbing, has been sanctioned and issued.

*(To be continued.)*

# THE MUSSULMANS AND COMPULSORY SERVICE IN BOSNIA-HERZEGOVINA.

Translated by permission of the Minister of War from the *Revue Militaire des Armées Etrangères.*

AT its sitting on the 28th of June, 1878, the Congress of Berlin decided to confide to Austria-Hungary the administration of the Turkish provinces of Bosnia and Herzegovina, and, the deliberations of the Congress finished, the Treaty of Berlin specified (Art. 25): "The provinces of Bosnia and Herzegovina will be occupied and administered by Austria-Hungary."

It was the end of the Turkish domination in these regions, which had lasted four hundred and fifteen years.

The taking possession proved a difficult operation for Austria. A real campaign had to be undertaken, and the effective strength of the Austro-Hungarian troops, at first fixed at 82,000 men, was quickly raised to 145,000 combatants, 4,500 horses, and 300 guns.[1]

Three years later an insurrection broke out in Herzegovina, caused partly by the introduction of compulsory service. It necessitated again on the part of the Austro-Hungarian Government a serious military effort to suppress it. Since then the country has remained quiet.

## I.

### The Country and the Inhabitants.

With a superficial surface of 51,000 square kilometres (19,619 square miles), that is to say, the tenth part of that of France, Bosnia-Herzegovina has a population of 1,721,720[2] inhabitants.

[1] The Austrian losses during the campaign (71 actions between the 3rd August and 30th October, 1878) were:—

| — | Killed. | Wounded. | Missing. | Total. |
|---|---|---|---|---|
| Officers ... ... | 44 | 131 | 3 | 178 |
| Men ... ... ... | 902 | 3,849 | 269 | 5,020 |

("The Occupation of Bosnia and the Herzegovina," published by the General Staff, Vienna, 1879.) In three months the expenses for the campaign amounted to 210 millions of francs (£8,400,000).

[2] Census of 1904.

"With the exception of Jews, Tsiganes (Gypsies), and some Turks, who live in the most populous towns of Bosnia, all the inhabitants of the Illyrian Alps are of the Slavic race. . . .

"If the Bosnians are, for the most part, united by race, they are divided by religion. . . . In spite of the advantages presented by the nature of the country and the climate from the point of view of defence, all the attempts at revolt against the rule of the Turks have lamentably failed. It is because the Mussulmans and the Bosnian Christians are opposed to each other, and that among the Christians themselves—the Catholic Greeks, governed by their Popes, and the Catholics from Rome, who obey implicitly their Franciscan priests—there is mutual detestation and treachery."[1]

Almost half the population (43 per cent., to be exact) profess the Orthodox Greek religion; rather less than a quarter (22 per cent.) are Catholics; more than a third (34 per cent.) are Mussulmans; the Protestants (0.3 per cent.) and the Jews (0.7 per cent.) are a very small number.

At the time of the conquest by the Turks, the majority of the old Bosnian landed proprietors of Slavic race, abjured Christianity, embraced the Mussulman religion in order to preserve their property and privileges, and converted their servants by force.

On the other hand, at this time the Turkish immigration brought into the country a pure Mussulman element; but after 1878 many of the Mahomedans returned to the land of Islam in order to escape from Christian domination.

Consequently the Mussulmans of Bosnia-Herzegovina comprise to-day the families of the old Slavic aristocracy who voluntarily abjured Christianity after the Turkish conquest, and the descendants of some Turkish military chiefs, who came originally from Asia Minor or Syria.

They inhabit chiefly the centre, South and East of the country. On account of their origin they form the richest part of the population. They have a very limited religious instruction, and they celebrate the Christian fête of Saint George, the patron of the Slavs.

Antipathetic to the Ottomans in consequence of their origin and in spite of their community of religion, the Bosnian Begs have not adopted all the requirements of Islamism. Polygamy is rare among them, and the women are not compelled to veil themselves.

There is, then, in Bosnia-Herzegovina unity of race—the Slav race—and diversity of creeds. Among these creeds, from the points of view of those professing them, Islam only takes second rank, and in the third of the population, grouped under the ægis of the Koran, the Mussulmans by descent, form but a very weak minority.

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[1] Elisée Reclus. *Géographie Universelle.*

## II.

### The Turkish Military Organisation.

For more than four centuries Turkey dominated in Bosnia-Herzegovina. Since 1826, and in a more complete fashion since 1843, Turkish subjects professing the Mussulman religion were, save in certain privileged provinces of the Sultan's Empire, regularly subject to compulsory military service.

"Constituted according to the principles of the Koran and designed with the view of the triumph of its religion, the Turkish Army could not, without danger to itself, and without shame to Islam, admit in its ranks the Infidels of the conquered countries. . . . The statesmen of Turkey, yielding to the pressing solicitations of Europe . . . duly undertook in 1856 to make military service obligatory on all Turkish subjects without distinction of creeds; but the facts prove that they have never really dreamt of putting this clause in practice.

"After having officially done away with the capitation impost paid by the Christians, and fixed *pro formâ* at 16,000 the number of recruits to be furnished, the Government substituted for this contingent a new impost, divided among all the Christian communities, which released them from conscription.

"In Bosnia at first, and in order to accustom the mass of the Mussulman population to the service, the Bosnian Frontier Regiment, *with some volunteers,* was organised and progressively raised to four battalions, and then the Herzegovinian Frontier Battalion. In 1865 *conscription* was introduced, and a brigade of Bosnian Militia was formed of two regiments of three battalions each. For a commencement obligatory military service appeared with all sorts of limitations and privileges. Then at the end of 1869, under cover of the general reorganisation of the Turkish Army, the Bosnian troops were placed on the same footing as the other troops of the Empire. In 1870 a new frontier battalion was created. Thus in less than ten years recruiting in Bosnia had been introduced and 18 battalions successfully raised—6 of the Nizam (Active Army) and 6 of the Redif (Reserve Army), raised by conscription, and 6 of Volunteers."[1]

At the time of the administration of these provinces being taken over by Austria-Hungary, the situation was then, from the military point of view, as follows: The Mussulmans since 1865 under compulsory military service, with numerous facilities (exemptions, provision of substitutes, etc.); the Christians excused from service but subjected in return to the payment of a special impost.

The country was divided into military districts.

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[1] *Voïénnyï Sbórnik* (Military Review), organ of the Russian General Staff, October, 1873.

Moreover, in order to maintain order and aid the administrative authorities, the Porte had organised a regiment of Gendarmes (*Zaptichs*), recruited among the Bosnian Mussulmans. This regiment consisted of 7 battalions—3,090 men, of whom 500 were mounted at their own expense.

## III.

### The Austro-Hungarian Organisation.

In the Austro-Hungarian Monarchy, Bosnia-Herzegovina, the occupied territory, was attached to neither Austria nor Hungary.

From the administrative point of view it depends on the Common Minister of Finance at Vienna. Under the orders of this last named, a General Officer, who is also the Civil Governor, directs the administration of the country and commands the military forces. He resides at Sarajivo. He has two colleagues—a General, as in the other regions of *Corps d'Armée;* and, in order to direct the civil administration, a high civil functionary.

At the commencement of the occupation the administration was purely military, with the assistance of native officials, who were retained at their posts, and Austro-Hungarian functionaries drawn from the interior of the Monarchy.

This transitory system still partly remains. The Governor is a General Officer; the postal service (as regards the carrying of the mails) is assured by soldiers of the Train; a railway (Banjaluka-Doberlin) is worked by the military.

The territory is divided into six *cercles;* the old Turkish *Sanjaks,* subdivided again into 54 districts. The first corresponds to our departments, the second to our arrondissements. At their head are placed Austro-Hungarian officials. The chief of the district is assisted by a Consultative Council, composed of notables nominated by the Government. He has at his disposal a civilian medical man, and, as assistant for military affairs, an under-officer. The service of the civil government has been completely organised since 1885. The registers are kept in the districts; out of regard for Mussulman usages, the women are only inscribed numerically, without indication of name.

Next below the districts are the Communes: organised Communes (97 important localities), or Country Communes.

In the first, the Mayor, his colleagues, and a part of the Municipal Council are nominated by the administration. Each religion is represented on the Council in the same proportion as among the inhabitants. In the towns the Mussulman element dominates, and almost all the Mayors are Mussulmans.

In the second the Mayor is also nominated by the administration, but the whole Council is elected.

In the one and the other the Mayors have no administrative right. Each week, on a fixed day, all the Mayors of the district

assemble at the principal place in order to report on what may have taken place in their communes, and to receive the instructions of the Chief of the district.

The elected representation of the interests of the people is thus very weak.

The State recognises four religions: the Catholic, Orthodox, Mussulman, and Jewish. It has left to the Mussulmans the rights of Mortmain, of which the revenue is rather high, viz., 1,500,000 francs (£60,000) in 1891. Owing to this, the State has not to intervene in questions relating to the Confessional Schools, Charitable Institutions, and the recruiting and maintenance of the inferior clergy of the Mussulman faith.

From the military point of view, the territory of Bosnia-Herzegovina forms the 15th Corps of the Austro-Hungarian Army. This corps is composed for the most part of elements foreign to the country. It is very strongly constituted, and has received an organisation adapted to the mountainous nature of the region.[1]

Under the recruiting regulations, the territory is divided into four districts. Each of these is commanded by a superior officer, assisted by a captain, a subaltern officer, and some non-commissioned officers. As has been already mentioned, a non-commissioned officer is attached to the Chief of each of the 54 administrative districts. The superior officer, Chief of the recruiting district, directs the recruiting and the administration of the Reservists. The recruiting districts are sub-divided into sub-divisions of classification, for which there is no special military authority.

## IV.

### The Law of Recruiting for the Natives.

As Bosnia-Herzegovina does not properly belong to Austria-Hungary, the recruiting law in force in the Monarchy cannot be applied integrally to that territory.

The military service of the natives is regulated by the provisional law of 24th October, 1881, supplemented, as regards the crime of insubordination, by the law of the 28th November, 1904. The details of its application were fixed by the Imperial Decree of the 1st November, 1881.

#### 1.—*General Provisions.*

By the terms of the law, "every native Bosnian capable of bearing arms is required to participate personally in the defence of his country and of the Monarchy, which gives protection and security to the countries administrated by it." (Art. 1.) This

[1]Composition of the 15th Corps: 35 battalions, 2 squadrons, 11 mountain batteries, 4 fortress batteries, 2 pioneer companies, 13 squadrons of train, divided into 2 divisions and 10 mountain brigades.

obligation commences on the 1st of January of the year (Gregorian Calendar), when the man enters on his 21st year.

The service imposed on the natives of Bosnia-Herzegovina, Christians, Mussulmans, and Jews alike is then personal and obligatory.

### 2.—*The Call to the Colours.*

*The Settling and Apportionment of the Contingent.*—The strength of the contingent is fixed each year by the Minister of Finance, charged with the administration of the provinces, in concert with the Minister of War. The Governor apportions it between the districts according to the return of the population.

*Classes of Age.*—All young men born in one year form an age class, which is designated by the year of birth.

Four classes are called upon for the annual revision: the first, second, third, and fourth.[1] The first comprises the men who are entering on their 21st year; the second, those who are entering on their 22nd, and so on.

*Returns.*—The lists comprising, by Commune, all the young men summoned to the call, are drawn up by the head of the administrative district. They are published, in each Commune, from the 1st to the 15th January, in such a way that every one can ascertain how he is himself affected.

After having settled the question of exemptions, the Chief of the district publishes, in the course of February, the names of the men called to draw by lot and to pass before the *Conseil de Revision.*[2]

*The Conseil de Revision.*—As in the interior of the Monarchy, this Council comprises the Chief of the recruiting district, an officer of the district, a military doctor, and, as representatives of the civil authority, the Chief of the administrative district, the district doctor, a minister of each of the creeds recognised by the State, and two members of the Consultative District Council. The Mayors are summoned to give their opinion on the cases of exemption applied for. They have to assist the authorities in all that concerns the work of the Board. The minimum height required is 1.551-m. (5 feet).

*The Drawing by Lot.*—A special provision exists on the subject of drawing by lot. In Austria-Hungary those called out cannot free themselves from this lottery, which has for its object to fix the order according to which those called out are classed as recruits or reservists of replacement (*ersatzreservisten*) and assigned to the Active Army or the Landwehr.

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[1] The third only in Austria-Hungary.

[2] The *Conseil de Revision* is a Recruiting, and at the same time a Medical, Board. It is the Board which has to examine every year the recruits from the medical point of view, to see if they are fit for the military service, and also to examine the claims for exemption from the service put forward by any of them.

In Bosnia-Herzegovina the man called out can be exempted from ballotting, and on this condition he is able to choose the corps which he wishes to enter.

The drawing by lot only applies to the men of the first age class. The numbers drawn by them apply when they are in the second, third, or fourth class.

The natives compelled to the service who are not fit for war service, but in consequence of their civil profession can render services in view of war, can, in case of war, be called up until they are thirty-three.

*Exemptions.*—The law has provided numerous cases where exemption can be claimed both in the case of those engaged in special professions and for family reasons.

It exempts from active service:—

1.—*In consideration of their special duties (definite exemptions.)*

*a.* Candidates for ecclesiastical employment in any of the four religions recognised by the State, on the condition that they show they are studying in any religious school approved of by the Ministry. In the case of mobilisation they will not be called out as reservists if they can prove to the recruiting authorities each year that they are still conforming to the above conditions.

*b.* The priests and clergy of recognised religions, church officials, and Mussulman magistrates. If they lose their ecclesiastical dignity, or if they cease those duties, they must submit to the military law of those of their class, and pass into the reserve on their leaving, into the fourth class for age.

*c.* Professors of different nationalities, Mussulman "*hodzas*" who are teaching in those primary schools recognised by the school authorities.

*d.* Doctors, veterinary surgeons, and certificated chemists, who are carrying on their profession with the assent of the local government. If they give up their professions, then they are recalled to serve under the same conditions as the priests and clergy.

2.—*For family reasons (temporary exemption).*

*a.* An only son, or failing that, only stepson of a father 70 years of age, or incapable of working, or of a widowed mother.

*b.* After the death of the father, the only grandson of a grandfather who is 70, or incapable of working, or the grandson of a widowed grandmother, if the grandfather and grandmother have no son living.

*c.* A brother in a family where the children are orphans. The son, grandson, or brother can have no claim

to exemption from service excepting in the case where he fulfils the indispensable duties of providing for the family in the place of his parents, grandparents, brothers, or sisters. An illegitimate son cannot be exempt unless he is positively fulfilling those same duties towards his mother. Under these same conditions are to be considered as in the same position as a son, only grandson, or brother, those whose only brother, or several brothers, are in the active service or in the reserve, who are under 18 years of age, or, in consequence of moral or bodily infirmities, are incaapble of working.

*d*. Anyone who marries with the authorisation of the local government before having completed his military service. If the wife has no father, brother or step-brother capable of working; if the husband lives with his wife in marital relations and is indispensable for providing for her subsistence, he is placed *en congé* in time of peace. If, without entirely responding to what is required for claiming exemption from service, the family situation or fortune of one liable to serve merits however special consideration, the being placed *en congé* can be granted either temporarily or definitely, but only during peace time.

*Postponement*.—A postponement can be demanded in order to follow studies already commenced. It can be granted by the general commanding the 15th Corps up to the autumn of the year when the man has completed his 23rd year.

A postponement of more than two years for entry into the Active Army does not count in the total time of service.

*Substitutes*.—Everyone called on to serve who has passed before the Council of Revision can during three months, starting from the day when he has been declared fit for service, present a substitute.

He must fulfil certain conditions, notably, be a native of Bosnia-Herzegovina, must be under 32 years of age, and not be the support of a family.

There is no limit to the number of substitutes, but they are generally very few—30, as a rule, out of an annual contingent of 3,500 men.

The authorities cannot intervene in the contract between the substitute and the man he is replacing. If the former receives a premium he deposits it in the Government bank, which becomes responsible to him and looks after his interests. This premium is remitted to the substitute to the amount of half at the end of his active service, and by sixths after his third, sixth, and ninth years' of service in the reserve.

If the substitute mutilates himself voluntarily or deserts, the premium in the first case reverts to the Treasury, and in the

second to the man whose place he has taken. This last has then himself to complete the term of service remaining to be done or find another substitute.

*Incorporation.*—The men passed for service are allotted to the Active Army. Those who join of their own free will are first incorporated, then, in order of the drawing by lot, those from each of the four age classes, until the number of recruits fixed for the district is completed.

When the contingent required for the Active Army is complete, those called up in excess are *supernumerary*. Those of the three first classes remain *en congé* at their homes until the following year; those of the 4th pass into the reserve, where they remain until they are thirty-two.

At his incorporation every native has to take the oath in these terms:—"Before God, the All-Powerful, I swear that I will be faithful to His Majesty the Emperor and King, and that I will obey all the orders of my chiefs, even at the peril of my life."

*Military Tax.*—In Austria-Hungary every person, wholly or partially relieved from military service for incapacity or emigration, is subjected to the payment of a military tax, which varies, in Austria from 2 kronen (1s. 8d.) to 200 kronen (£8 6s. 8d.); and in Hungary from 6 kronen (5s.) to 240 kronen (£10).

In Bosnia-Herzegovina there is no military tax.

4. *Bases of Service.*—The service of the natives is regulated as follows: 3 years in the Active Army, and 9 years in the Reserve, a total of 12 years.

In the rest of the Monarchy, the military service comprises: 3 years in the Active Army, 7 years in the Reserve, and 2 in the Landwehr, a total of 12 years. But up to 42 years the man is liable for service in the Landsturm, whilst in Bosnia-Herzegovina there is no Landsturm, only the Landwehr, or *Ersatz-Reserve*.

The service of the Bosnians is completed exclusively in their own corps, and it commences from the day when the man called up is declared fit for service (*assentirt*), while in the rest of the Monarchy service dates solely from the day of incorporation. The man can be freed from service:—

1. If he has been incorporated illegally;
2. If he becomes incapable of serving;
3. If he, later on—either before he had joined or after—fulfils the conditions required for exemption from active service.

The periods of instruction of the Bosnian Reservists are regulated each year by special arrangements.

5. *Engagements and re-engagements.*—Every native can contract a voluntary engagement, on condition that he is at least 18 years old, or 36 years at the most; but in the case of minors, it must be done with the consent of the father or tutor.

Those who have been punished for a crime or for an offence caused by the love of lucre are alone excluded from this right of self-engagement. The man who so engages himself has the right of choosing his regiment.

There are no Bosnian one-year volunteers.

The re-enlistments are regulated by the same rules as in the rest of the Army. The non-commissioned officers, who have 12 years' active service, of which eight at least has been passed as non-commissioned officers, receive a certificate, and can lay claim to public employment or to a situation in an enterprise subsidised by the State.

This length of service is fixed at eight years, five of which must be as non-commissioned officer, when these eight years have been passed in Bosnia-Herzegovina, and it is then to employment in the administration of these same provinces that the man has the right to aspire to. The number of non-commissioned officers in a position to profit by this is to-day very limited, in consequence of the regular relief of the troops detached in the occupied territory. The natives are rarely—one might say never — in a position to avail themselves of the privilege, since almost the whole of the Bosnian troops are garrisoned in the interior of the Monarchy.

Every man who has completed his active service, and to whom "his remaining in the active service appears as advantageous," can re-engage from year to year during the period and even beyond the period of his service in the Reserve.

6. *Penal Dispositions.*—Every defaulting recruit loses the benefit of ballotting and that of all exemption from service. Up to 36 years of age he is to be searched for and brought before the *Conseil de Revision*. If he is passed as fit for service and cannot justify his absence, but has voluntarily presented himself, he serves a year more than the three years of the normal active service; two years more if he has not come forward voluntarily.

If he is not passed for service he is liable to a maximum fine of 150 florins (£12 10s.), and if he cannot pay, to an imprisonment of one month. If the defaulter is over 36 years of age, the fine can be raised to 1,000 florins (£83 6s. 8d.) and the term of imprisonment to six months.

The accomplices of a defaulter are liable to a maximum fine of 500 florins (£41 13s. 4d.), and under certain circumstances of 1,000 florins (£83 6s. 8d.), and in case of insolvency, to imprisonment for three or six months.

If in a Commune there are a rather large number of defaulters, special measures are to be taken by the local government against that Commune. There is thus, then, in certain cases, a collective communal responsibility.

Natives summoned to the colours who voluntarily mutilate themselves, so long as they are capable of serving, are passed as fit for service, and must serve five years instead of three.

Every native of the Active Army or of the Reserve, bound by oath to the service, who is more than fourteen days in responding to the summons to active service as a young soldier, or to an order of recall from the Reserve by Imperial Decree, is punished with from three to twelve months of cells in time of peace, of a year to five years in case of mobilisation or in time of war.

When, called out for active service as a young soldier, he joins after a delay of less than fourteen days, or when as a Reservist he arrives late for a period of training, he is punished with from one to three months imprisonment.

(*To be continued*).

# NAVAL NOTES.

**Home.** The following are the principal appointments which have been made:—

Rear-Admirals—G. A. Callaghan, C.V.O., C.B., to be Second-in-Command of the Mediterranean Battle Fleet; R. S. Lowry to Command of Fifth Cruiser Squadron; C. J. Briggs to be Rear-Admiral in the Nore Division of the Home Fleet; C. Burney to be Rear-Admiral in the Plymouth Division of the Home Fleet; F. T. Hamilton, C.V.O., to Command of Second Cruiser Squadron. Captains—Commodore L. Bayly, C.V.O., to Command of the Royal Naval War College; E. C. T. Troubridge, C.M.G., M.V.O., to be Commodore, 2nd Class, to Command of Naval Barracks, Chatham; E. F. B. Charlton to "Topaze," as Commodore 2nd Class in Home Fleet, in charge of destroyers in Commission with full crews; H. J. Savill to "Prince George" and as Flag-Captain to Rear-Admiral Bush, C.V.O.; P. Nelson-Ward, M.V.O., to "Enchantress"; W. S. Bowman to "Assistance"; B. J. Yelverton to "Vengeance"; W. E. Goodenough to "Duncan," and as Flag-Captain to Rear-Admiral Callaghan, C.V.O., C.B.; T. D. Sheppard, M.V.O., to "Sutlej"; W. C. Nicholson to "Achilles"; G. H. Mundy, M.V.O., to be Captain-Superintendent of Pembroke Dockyard; B. Currey to "Agamemnon"; the Hon. H. L. Hood, M.V.O., D.S.O., to "Commonwealth"; D. Beatty, M.V.O., D.S.O., to "Queen"; J. S. Luard to "Exmouth," as Captain and Chief of the Staff to Admiral the Hon. Sir A. G. Curzon-Howe, K.C.B., K.C.V.O., C.M.G., Commander-in-Chief in the Mediterranean.

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Admiral Sir C. C. Drury, G.C.V.O., K.C.B., K.C.S.I., hoisted his flag as Commander-in-Chief at the Nore on the 2nd inst., in succession to Admiral-of-the-Fleet Sir G. H. U. Noel, K.C.B., K.C.M.G., whose Union flag was struck at sunset of the same day. Vice-Admiral the Hon. Sir A. G. Curzon-Howe, K.C.B., K.C.V.O., C.M.G., assumed command of the Mediterranean Fleet, with acting-rank as Admiral, at Malta, on the 20th ult., in succession to Admiral Sir C. C. Drury. Vice-Admiral H.S.H. Prince Louis of Battenberg, G.C.B., G.C.V.O., K.C.M.G., assumed command of the Atlantic Fleet on the 15th ult., in succession to Vice-Admiral the Hon. Sir A. G. Curzon-Howe; Rear-Admiral G. A. Callaghan, C.V.O., C.B., arrived at Gibraltar on the 1st inst., and hoisted his flag on board the battle-ship *Duncan*, as Second-in-Command of the Mediterranean Fleet, leaving for Malta the same evening.

**Home.**

The first-class battle-ship *Queen*, bearing the flag of Admiral Sir C. C. Drury, late Commander-in-Chief in the Mediterranean, arrived at Sheerness on the afternoon of the 28th ult. from Gibraltar; she has since left for Devonport, where she will pay off and prepare for service with the Atlantic Fleet, as flag-ship of the Rear-Admiral.

The second-class cruiser *Diana* arrived at Plymouth on the 9th ult. from the Mediterranean, paid off at Devonport on the 16th ult., recommissioning on the following day for a further term of service in the Mediterranean, and left again on the 24th ult. for her station.

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*Launch of the "Collingwood."*—The new first-class battle-ship *Collingwood* was launched on Saturday, the 7th ult., from Devonport Dockyard, Mrs. Asquith, the wife of the Prime Minister, performing the naming ceremony. There is not much information to be given about her, owing to the present policy of secrecy which is maintained in regard to new ships. She is a sister-ship to the *St. Vincent*, launched at Portsmouth last September, and is an improvement on the *Temeraire*, her immediate predecessor on the slip at Devonport. Her dimensions are as follows:—Length, 536 feet; beam, 84 feet; draught, 27 feet, with a displacement of 19,366 tons. Her turbine engines are to develop 24,500-I.H.P., giving a speed of 21 knots. Her main armament will consist of ten 50-calibre 12-inch guns, which, with an increased velocity, have a greater energy and penetration than the earlier types of this gun, and she will carry an anti-torpedo armament of twenty 4-inch guns, as against the sixteen of her immediate predecessors.

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*Steam Trials of the "Defence."*—The new first-class armoured cruiser *Defence*, designed by Sir Philip Watts, and built at the Pembroke Dockyard, has finished her official steam trials with completely successful results. The *Defence* belongs to the pre-*Dreadnought* era, but marks the transition stage. Excepting the ships of the *Invincible* type, this vessel, with her sister cruisers, the *Minotaur* and *Shannon*, is the most powerful of her class in the Fleet. A special interest attaches also to the trials as she is the last present-day British war-ship fitted with reciprocating engines. It is significant, too, that the constructors of the machinery—the Scotts, of Greenock—have had an association with the Navy extending over a century, being the oldest existing manufacturers of propelling machinery for war-ships, and they are the contractors for the turbine machinery of one of our latest battle-ships.

The *Defence* has a length of 490 feet, a beam of 74 feet 6 inches, and displaces 14,600 tons when the draught is 26 feet. Her armament includes four 9·2-inch and ten 7·5-inch breech-loading guns, and 16 small Q.F. guns. The machinery is of the four-cylinder triple-expansion type, which extensive experience has brought to such a high degree of efficiency in British naval practice. There are two entirely independent sets, each in separate water-tight compartments, and each driving its own screw propeller. On the full-power trial, of eight hours' duration, the mean revolutions per minute were 127, and the engines indicated 27,570-H.P. As there was a haze in the Channel, it was considered preferable to run the trial in waters not frequented by shipping, and, therefore, no

**Home.** attempt could be made to ascertain the speed. This was not necessary, as the two preceding ships — the *Minotaur* and the *Shannon* — easily exceeded the speed aimed at — 23 knots — with the designed power, and the *Defence* exceeded this designed power by 570-I.H.P. The rates of coal and water consumption per unit of power were satisfactorily low. The vessel also ran the prescribed trials at one-fifth and four-fifth power, to determine the radius of action. On the latter of these 30 hours' trials the power averaged 19,500-I.H.P. with the engines running at 115 revolutions, and the speed was 20·9 knots—a successful result.—*Précis* from the *Times*.

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**France.** *The New Minister of Marine.*—As a result of the debate in the Chamber on "*Les Catastrophes de la Marine*," M. Thomson, Minister of Marine, has resigned, and has been succeeded by M. Alfred Picard.

The New Minister of Marine, who is a civil engineer by profession, was born at Strasburg in 1844; he entered the Ecole Polytechnique in 1862, and completed his studies at the Ecole des Ponts et Chaussées. He served in the Armée de la Loire in the war of 1870-71, and after the peace, was employed on the Chemin de fer de l'Est, and the Marne and Rhine Canal, and various important engineering works were under his supervision. In 1880 he was appointed director of navigation routes, mines, and railways, and after this President of the section of public works. In 1889 he was reporter of the Paris Universal Exhibition, and in 1900 General Commissioner of the Paris Exhibition of that year. He has recently been appointed President of the Commission to investigate matters connected with the State purchase of the Ouest railway.

The New Minister of Marine has selected Capitaine de Vaisseau Morin, as the Chief of his Naval Cabinet, who was only promoted to his present rank in September last, and for the French Navy is young for his rank, having just turned forty. His last command was in charge of the Naval Division at Diego Suarez, Madagascar, where he proved himself to have all the qualities of a good organiser.

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*The Supplementary Vote for the Fleet.*—The supplementary vote asked for the Navy over this year's Estimates, when it came before the Chamber gave rise to considerable criticism and discussion. The necessity for the vote was not contested, but it was thought the expenditure ought to have been foreseen in time for it to be included in the regular estimates.

The sum of 900,000 francs (£36,000) was demanded for installation of wireless telegraphy on 47 large ships and 18 destroyers, and 8,300,000 francs (£340,000) was asked for to supplement the artillery vote. This latter sum has been reduced by 1,500,000 francs (£60,000).

The Committee of the Chamber has voted 2,400,000 francs (£96,000) for new powder, 730,000 francs (£29,200) for installation of optical sights, and 3,670,000 francs (£98,800) for projectiles to complete the stores of certain ships recently commissioned, and to provide a reserve of projectiles equal to one and a half times the quantity embarked.

The ships to be completed with projectiles are the six 15,000 ton battle-ships of the 1900 programme, *Patrie*, *Republique*, *Democratie*, *Justice*, and *Vérité*, now all in commission, and the fact that these

**France.** new ships had been sent to sea, and are now at sea without their full complement of projectiles, was very adversely criticised. Also the four armoured cruisers, *Jules-Michelet*, *Ernest-Renan*, *Edgard-Quinet*, and *Waldeck-Rousseau*, as well as 26 destroyers, two only of which are in commission, the remainder being due to complete in 1908, 1909, and 1910.

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*Grounding of the "Condé."*—At 5 a.m. on the morning of the 20th ult., the first-class armoured cruiser *Condé*, while entering the Bay of Ajaccio, struck on a reef, on which there was rather less than 23 feet of water; the weather was bad at the time, and it was feared at first that her position might become critical. Fortunately the weather moderated, and having discharged some 700 tons of coal and stores, she, with the assistance of the *Victor-Hugo* and *Charles Martel*, was refloated on the following day without having sustained damage, except to her wooden false keel, which was completely smashed up where she had struck. She maintained a speed of 16 knots during her return to Toulon. A Court of Enquiry into the cause of the accident has been held, but its report has not yet been made public. The *Condé* had been taking part in a series of manœuvres, which were being carried out under the orders of Vice-Admiral de Jonquière, the Inspector-General of the torpedo-flotillas, whose flag at the time was flying on board the *Charles Martel*. The ships engaged were the 2nd Division of the Mediterranean Fleet, under Rear-Admiral Le Pord, the 4th Division under Rear-Admiral Chocheprat; the three armoured cruisers *Jules Ferry*, *Victor-Hugo*, and *Condé*, with three torpedo-flotillas, consisting of 24 torpedo-vessels.

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*Repairs of the Mediterranean Fleet.*—The following regulations have been issued with regard to carrying out the repairs to ships of the Mediterranean Fleet:—Each ship is to undergo once yearly an extensive refit (*grand carénage*) and a small one (*petit carénage*). The principal refit will take place at Toulon, last six weeks, and include docking, necessary dockyard repairs and cleaning. Only one engine is to be dismantled at a time, and the work is to be so arranged that the ship can be ready for sea in 48 hours. The small refit also includes the docking of the ship, the painting of the hull, and small outstanding repairs, which can be carried out with the means on board. The principal refit will be carried out by the 1st Division between the 1st December and 15th January; the 2nd Division, between the 1st April and 15th May; 3rd Division, between the 15th October and 1st December; and the 4th Division between the 15th May to 1st July; the Cruiser Division between 1st September and 15th October.

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*Armour Trials.*—Some interesting armour trials have taken place at Lorient against a caisson, representing the hull, with the armour of the new battle-ship *Mirabeau*, at present building at the Caudan Yard, to test the power of resistance of the protection. The caisson was moored in Lorient Roads, to the south of the Isle of Saint-Michel. A torpedo, charged as for service, was then launched from a distance of some yards

France. against the caisson; on its coming into contact with the armour belt, the torpedo exploded, throwing up an immense volume of water to a height of over one hundred feet, and the caisson, shattered, immediately sank. It is to be refloated, so that the damage done can be ascertained.

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*New Destroyers.*—The following are the characteristics of the seven destroyers of this year's programme, which are shortly to be laid down:—Length, 254 feet; beam, 24 feet 6 inches; extreme draught, 9 feet 8 inches; displacement, 714 tons. Two of the destroyers are to be fitted with turbine engines on the Schneider-Jölly system; the remaining five are to be fitted with turbines on three different systems; there will be four boilers, with a heating surface of 475 square metres (1,563 feet), and oil fuel; the speed is to be 31 knots, while a premium is to be paid for each knot in excess up to 33. The height of the forecastle out of water is to be 14 feet 8 inches, and the torpedo armament will consist of four twin torpedo-tubes, working on a central pivot on deck, with six 45-cm. (18-inch) torpedoes, of which four are kept in the tubes; two 10-cm. (4-inch) and four 6·5-cm. (4½-inch) Q.F. guns, the first two being supplied by an electric ammunition hoist. The crew will consist of 4 officers and 58 men. The cost inclusive of armament to be £135,000. The seven latest destroyers of the 1909 Budget are, it is believed, to be of a similar type.—*Le Temps*, *Le Vie Maritime*, and *Le Moniteur de la Flotte*.

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*The Naval Situation, by M. Rousseau.* Letter No. 6.—The summary that has been given of the naval *matériel* possessed by the different great Powers, shows what a formidable force the old proverb, "*Si vis pacem para bellum*" obliges them to maintain to preserve that greatest blessing of humanity—peace. Ideas at present are so peaceful that no country except ours shows any hesitation in increasing the capacity for peace as represented by naval and military armaments, and no sacrifice to this end is too great. War Budgets are becoming more and more heavy to bear; but if these charges are looked at as an insurance premium, and a guarantee for the security of national property, they must not be taken as unprofitable; a moment comes when military charges cease to be unprofitable, and this is all the more when the reciprocal value of the forces are the more difficult to estimate.

It is uncontestable that the greatest factor of peace in modern times is the naval supremacy of England. The British fleet has been the most powerful argument for preventing international complications, and its weakening cannot but precede a troublous time for the whole world; it is still in the full vigour of its strength, but signs of retrogression are not wanting, and the future—almost the immediate future—is not assured. The causes of this falling off are not as might be thought due entirely to a reduction of the Budget; the decadence, unfortunately, so much to be feared of the British Navy is chiefly the result of two errors in judgment: one, that of having for an instant forgotten that its object should be simply and solely pacific, and that its interests are closely bound up with those of no matter what other European country; the other, that of having invented a fighting machine which depreciates the value of her own reserve of *matériel*, and belittles the advantage given by her *points d'appui* scattered throughout the globe. England forgot

**France.** her peaceful rôle in 1903. If it may not be said that English diplomacy brought about the Russo-Japanese conflict, it cannot be doubted that it was looked upon with a favourable eye; the naval power of Russia was increasing, the *Suvarofs* were in course of construction, and the *Andrei-Perwosrvannys* of more than 17,000 tons were being laid down. This activity disquieted England, and the Russian programme of naval construction was the object of numerous questions in the English Parliament, while the *Navy League Journal* of September, 1903, published the following note:—

> "It has been suggested that, in face of the great Russian naval programme for the current year, the British Navy should abandon its old rule of the two-Power standard."

The conflict between Japan and Russia ended in an unexpected manner. The actual loss of ships was relatively small, but a number of vessels lost by the Russians were captured by the Japanese, whose fleet by these acquisitions, and by work done in its own arsenals, has been nearly doubled. The fleet of the Empire of the Rising Sun is increasing day by day, so much so that Lord Brassey in the *Naval Annual* of 1907, stated:—"If the French do not bestir themselves, the Japanese fleet will before long be superior to that of France."

The Russo-Japanese War has had the effect of creating in the neighbourhood of China (that immense country on which the whole world believes it has rights) an important naval power, able to boast of having raised the prestige of the yellow race, and of having conquered Europe, the small Continent, which imposes its domination on the whole world. It is not only on a military basis that the Japanese victory rests; Japan has also entered into a commercial struggle with Europe. The treaty of peace with Russia was hardly signed before a number of Japanese shipowners decided to compete with the flags of European nations on every sea. Thanks to the low wages, it is hardly necessary to add that the enterprise has been crowned with success. Here is an extract from the British Consular report on Japanese commerce during 1906:—

"The close of the war has resulted in an important re-organisation of the Japanese steam-ship lines. The three principal companies—Nippon Yusen Kaisha, Osaka Shosen Kaisha, and Toyo Kisen Kaisha—have taken up again their former lines of service. The Nippon Yusen Kaisha has on its European line twelve steamers of 6,000 tons and upwards; on the Australian line, three large steamers; and on the line to Seattle, in combination with the Great Northern Steamship Company, six steamers of 4,800 to 7,400 tons. The same company has a fortnightly service to Bangkok, and several steamers running to China. The line to Bangkok was new in 1906 and has attracted attention because of its competition with the Russian line of steamers from China to the same port. A combination that attracted considerable notice in 1906 was the partial union of the Nippon Yusen Kaisha and the Osaka Shosen Kaisha with two smaller companies, the Konan Steam-ship Co. and the Daito Steam-ship Co., having the special object of developing the navigation of the 'Yangtse,' the capital is 8,100,000 yen, equal to £827,000. Several new lines have also been opened or are projected by diverse companies to South America, Mexico, Java, Hawaii, etc."

France. The figures for the year 1907 are not yet published, but the *Répertoire Général de la Marine maschande du bureau Veritas* permits us to estimate the progress made by the commercial marine of Japan, as shown by the following table.

| Years. | Number. | | Tonnage. | Totals. |
|---|---|---|---|---|
| | | | | Tons. |
| 1904-06 ... | Sailing-ships ... | 1,582 | 184,220 | 830,198 |
| | Steamers ... ... | 556 | 645,978 | |
| 1907-08 ... | Sailing-ships ... | 1,332 | 168,374 | 1,208,917 |
| | Steamers ... ... | 628 | 1,040,543 | |

Thus in four years there is a gain of 378,711 tons, or an increase of 31 per cent. Japanese influence is extending like a spot of oil. Japan is now in direct contact with Canada, the United States, Australia, the colony of the Cape of Good Hope, and India. In all the immense sea-space between the West Coast of America and the East Coast of Africa, the mercantile flag of Japan aims at taking the first place. The well-known English P. & O. Company has had to curtail its traffic to Bombay, because of Japanese steamer competition on the line of traffic across the Bay of Bengal to Japan. The sound of the firing at the battle of Tsu-shima has awakened the yellow world.

England is the country which up to the present has suffered most, from a commercial point of view, by this competition with the Asiatic races, for not only has her mercantile marine been hit, but also her commerce. England, commercially the great intermediary, which in a way levies a tax on the commerce of the whole world under the form of commission and freight, sees a part of these resources compromised, and a crisis within view. Lloyd's sounds the note of alarm in its most recent reports, and the newspaper, *Engineering*, states that the falling off in the ship building trade amounts to 459,000 tons in twelve months. It would be stretching a point to try and establish a relation between this development of the Japanese marine and the decrease in ship building in England. The coincidence is, nevertheless, remarkable, and it is certainly clear that Japanese ships can only increase in number at the expense of the Power which almost monopolises the trade of the China Sea and Pacific Ocean.

But England is not the only nation that has suffered by this evolution of the trade of the Far East. Japanese vessels are also competing seriously with the German lines, and commercial interests are not the only ones to suffer. Nearly all the European nations have possessions in the Far East: England has Singapore and Hong Kong; France, Indo-China, Tonkin, and Annam; Germany, Kiao-Chiao; the United States the Philippines; and Holland the East Indian Islands, and their domination is compromised by the return of a national spirit, so long dormant in Eastern nations; the movement is extending, and has appeared in British India where disquieting signs of revolt have lately been evident. England is the ally of Japan, and France has also contracted a treaty with the latter Power; but the advantages to the two former are purely

**France.** negative, while Japan is assured of a period of peace in which to develop her commercial prosperity at the expense of her two allies.

Lord Esher, in the *National Review*, lays down that England will be forced to abandon her commercial supremacy in the Pacific, Asiatic, and American coasts to Japan, the United States, and Germany, and he considers it can only continue a peaceful rivalry on the condition that she maintains uncontested superiority in the seas which wash the British Islands, and that to build two battle-ships for every one built by her rivals is for her a question of life and death, and the longer she hesitates to make the necessary sacrifices, the more difficult it will be for her to regain her naval supremacy, both at home and abroad.—*Le Temps.*

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**Germany.** *Cost of the Fleet.*—The cost of the Fleet in Commission is distributed as follows :—

*1. The Battle Fleet.*

| | 1908. | | | 1907. | |
|---|---|---|---|---|---|
| | Marks. | £ | s. | £ | s. |
| Active Squadron ... ... ... ... | 11,002,702 = | (550,135 | 2) | 482,774 | 17 |
| Reserve ... ... ... ... .. ... | 1,220,580 | (61,029 | 0) | 48,809 | 14 |
| Scouting Division ... ... ... ... | 5,637,574 | (281,878 | 14) | 206,641 | 18 |
| Torpedo Flotillas ... ... ... ... | 3,782,776 | (189,138 | 16) | 173,072 | 5 |
| Total ... ... ... ... | 21,643,632 | (1,082,181 | 12) | 911,298 | 14 |

Showing an increase of 3,417,658 marks (£170,882 18s.) as compared with last year.

*2. Ships on Foreign Stations.*

| | | | | | |
|---|---|---|---|---|---|
| The China Station ... ... ... ... | 4,050,328 | (202,516 | 8) | 178,565 | 2 |
| The Australian Station ... ... ... | 241,200 | (12,060 | 0) | 26,917 | 4 |
| The West African „ ... ... ... | 445,716 | (22,285 | 16) | 10,984 | 16 |
| The East African „ ... ... ... | 489,840 | (24,492 | 0) | 13,774 | 4 |
| The American „ ... ... ... | 478,056 | (23,902 | 16) | 50,639 | 8 |
| Constantinople Stationaire ... ... ... | 93,624 | (4,681 | 4) | 4,122 | 12 |
| Surveying Duties ... ... ... .. | 157,608 | (7,880 | 8) | 7,572 | 0 |
| Total ... ... ... ... | 5,956,372 | (297,818 | 12) | 292,575 | 6 |

Showing an increase of 104,866 marks (£5,243 6s.) as compared with last year.

*3. Training Ships.*

| | | | | | |
|---|---|---|---|---|---|
| Cadets' and Boys' Training Ships ... ... | 2,621,618 | (131,080 | 18) | 91,635 | 0 |
| Gunnery School Ships ... ... ... ... | 1,614,005 | (80,700 | 5) | 79,389 | 0 |
| Torpedo School Ships ... ... ... ... | 1,214,242 | (60,712 | 2) | 54,231 | 15 |
| Submarine Mining ... ... .. ... | 616,320 | (30,816 | 0) | 28,685 | 12 |
| Coast Pilotage ... ... ... .. ... | 59,822 | (2,991 | 2) | 2,669 | 0 |
| Total ... ... ... ... | 6,126,007 | (306,300 | 7) | 256,610 | 7 |

Showing an increase of 993,800 marks (£49,690) as compared with last year.

*4. Special Service Ships.*

| | | | | | |
|---|---|---|---|---|---|
| Imperial Yacht "Hohenzollern" ... ... | 403,680 | (20,184 | 0) | 18,913 | 4 |
| Surveying Ships (Home Waters) ... .. | 44,256 | (2,212 | 16) | 2,082 | 0 |
| Artillery Experiments ... ... ... ... | 662,700 | (33,135 | 0) | 30,579 | 0 |
| Torpedo Experimental Ship ... ... ... | 753,024 | (37,651 | 4) | 38,759 | 8 |
| General Experiments ... ... ... ... | 218,724 | (10,936 | 4) | 11,251 | 4 |
| Fishery Protection ... ... ... ... | 168,583 | (8,429 | 3) | 7,588 | 17 |
| Total ... ... ... ... | 2,250,967 | (112,548 | 7) | 109,173 | 13 |

**Germany.** Showing an increase of 67,494 marks (£3,374 14s.) as compared with last year.

| | 1908. Marks. | £ s. | 1907. £ s. |
|---|---|---|---|
| 5. *For Special Purposes* ... ... ... | 743,440 | (37,172 0) | 37,797 6 |
| **Combined Total.** | | | |
| Battle Fleet ... ... ... ... ... | 21,643,632 | (1,082,181 12) | 911,298 14 |
| Foreign Service ... ... ... ... ... | 5,956,372 | (297,818 12) | 292,575 6 |
| Training Ships ... ... ... ... ... | 6,126,007 | (306,300 7) | 256,610 7 |
| Special Service Ships ... ... ... ... | 2,250,967 | (112,548 7) | 109,173 13 |
| Special Purposes ... ... ... ... | 743,440 | (37,172 0) | 37,797 6 |
| Total ... ... ... ... | 38,720,418 | (1,836,020 18) | 1,607,455 6 |

Showing an increase of 4,571,312 marks (£228,565 12s.) as compared with last year.

*Etat für die Verwaltung der Kaiserlichen Marine, 1908.*

**United States.**

**Vessels Building.**

| Name. | Speed. Knots. | Where Building. | Per cent. of Completion Aug., 1908. |
|---|---|---|---|
| *Battleships.* | | | |
| South Carolina ... ... | 18·5 | Wm. Cramp & Sons ... | 55· |
| Michigan ... ... | 18·5 | New York Shipbl'g Co. | 60·4 |
| Delaware ... ... | 21 | Newport News ... | 35·3 |
| North Dakota ... ... | 21 | Fore River ... ... | 45·7 |

*The "South Carolina."*—On 11th July, the second of the American "all big gun" battle-ships was launched by William Cramp & Sons, Philadelphia. This ship, which is a sister of the *Michigan*, launched in May, has a length of 450 feet on the water-line; a beam of 80 feet, moulded; and a mean draught of 24 feet 6 inches. The displacement on this (trial) draught is 16,000 tons, while the full-load displacement is 17,617 tons. Propulsion is by means of two four-cylinder triple-expansion engines driving twin screws. The cylinders measure 32, 52, 72, and 72 inches in diameter, with a stroke of 48 inches. Steam is furnished by 12 Babcock & Wilcox water-tube boilers at a pressure of 265 pounds to the square inch. These boilers have a total grate surface of 1,050 square feet, and a heating surface of 47,220 square feet, the ratio being 45 to 1. The designed I.H.P. is 16,500, corresponding with a trial speed of 18½ knots. The normal coal supply of 900 tons can be increased to a maximum of 2,175 tons.

The main point of interest lies in the battery and its arrangement. There are eight 12-inch guns of 45 calibres, mounted in pairs in four turrets, all on the centre line, the two inner turrets being raised above the end turrets, so that four guns may be fired forward, four aft, and the entire eight on either broadside. Each turret has an arc of fire of 270 degrees. The first and third turrets, counting from the bow, have their gun axes about 24 feet above the water-line. The second turret shows an axis of 32 feet above the line of flotation, while the after turret has its guns 16 feet above the water. The secondary battery includes twenty-two 3-inch guns; two 21-inch submerged torpedo-tubes; and fourteen automatic guns.

**United States.**

The water-line belt of armour extends from bow to stern. It is 8 feet wide, of which about 5 feet is below the normal water-line. The maximum thickness is 11 inches, tapering to 9 inches at the bottom. Above this belt, and covering the side for about 300 feet, is an upper belt, 10 inches thick at the lower edge and 8 inches thick at the upper, with 10-inch bulkheads, running across the ship at the ends. The barbettes for the turrets are 10 inches on the face and 8 inches in the rear, while the turrets themselves are 12 inches in front and 8 inches in the rear. A conning-tower 12 inches thick is fitted just aft of the second turret, and is provided with a 9-inch tube, protecting communications to the interior of the ship. The protective deck has a thickness on the slopes of 3 inches, and is 1½ inches thick forward.

The ships were authorised 3rd March, 1905, and contracts for construction were let in July, 1906. The keels were laid in December, 1906, and the contract calls for completion late in 1909. The contract price of hull and machinery for the *South Carolina* was 3,540,000 dollars (£727,422), and for the *Michigan*, 3,585,000 dollars (£736,670). In each case the cost of the completed vessel will be about 7,000,000 dollars (£1,440,000).—*International Marine Engineering.*

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*New Submarine.* — The Navy Department has made a contract with the Lake Torpedo-boat Company for what is to be called a submarine cruiser of 500 tons displacement when submerged and 161 feet in length. This will be the largest submarine yet built for the Government, and it will place the United States well in the lead in the development of submarines. The new boat is to have fourteen knots speed on the surface and 9·5 knots submerged. The builders have, however, given assurances that they will attain a surface speed of sixteen knots an hour. The boat is to be finished 1st May, 1910, when, if she comes up to the specifications, the builders will be paid 450,000 dollars for her. Her radius of action submerged is to be seventy hours, and her steaming radius on the surface over 3,000 knots. Such a boat will be one-third longer and larger than any yet built for the United States. Great Britain in 1904 built ten submarines of 300 tons' displacement, and is now building even larger ones. France, which leads the world in the number and performance of her submarines, is building two of 800 tons displacement and has sixteen of 398 tons. The new Lake boat will utilise the hydroplane, the original idea of Simon Lake, which all the leading navies of the world have adopted. The boat will not be a diver or plunger, but will rise and sink with an even keel. She will carry six torpedo tubes and ten torpedoes. This is two more than any boat now owned by the Government carries. The Lake combines many valuable features, among which are larger than usual quarters for officers and men, the drop keel, which, it will be remembered, in the recent collision under water of the French submarines, saved the lives of the crews of both boats; large navigating turret, water-tight superstructures for storage of air and gasoline, the use of wheels, by which the boat may crawl on the bottom and so be operated in channels, and an ingenious door in the bottom, by which a diver may get out on the bottom of the sea and work on a wreck or on mines. The new

**United States.** boat will be driven by gasoline. It is fifteen years since Mr. Lake began to seek recognition from the United States Government for his invention in submarine navigation. He has built many boats for foreign Governments, but has up to this time received no contract from this Government. The Lake submarine cruiser will be able to cross the Atlantic under her own power, and, if required, can make the voyage to the Philippines. The boats that have been built for Russia by the Lake Company are required to make the ocean trip from the Baltic to the Black Sea.—*Army and Navy Journal.*

## MILITARY NOTES.

**Home.** The following are the principal appointments which have been made:—

General—Sir H. N. D. Prendergast, V.C., G.C.B., Royal (late Madras) Engineers, to be Colonel Commandant, Royal Engineers.

Lieut.-General—F. W. Kitchener, C.B., to be a General Officer Commanding-in-Chief.

Major-Generals—Sir H. C. O. Plumer, K.C.B., Commanding 5th Division, to be Lieut.-General. R. A. Montgomery, C.V.O., C.B., from Commanding the Transvaal District, to be Vice-President, Ordnance Board. Sir R. C. Hart, V.C., K.C.B., K.C.V.O., Commanding Cape Colony District, to be Lieut.-General.

Colonels—A. P. Penton, from Vice-President Ordnance Board, to Command the Royal Artillery in Malta, and is granted the temporary rank of Major-General whilst so employed. F. A. Curteis, from Commanding the South-Eastern Coast Defences, to Command the Western Coast Defences, and is granted the temporary rank of Brigadier-General whilst so employed. G. H. Bittleston, from h.p., to Command the South-Eastern Coast Defences. L. G. Drummond, C.B., M.V.O., from h.p., to be a Brigadier-General to Command an Infantry Brigade, and is granted the temporary rank of Brigadier-General whilst so employed. R. B. Williams, from h.p., to be an A.A. and Q.M.G. E. S. May, C.B., C.M.G., from an A.Q.M.G., is appointed to the General Staff with the temporary rank of Brigadier-General. H. I. W. Hamilton, C.B., D.S.O., A.D.C., from Commanding 7th Infantry Brigade, is appointed to the General Staff, with the temporary rank of Major-General. P. R. Burn-Murdoch to be a Chief Engineer. C. A. Hadfield, Inspector of Army Service Corps, to be Major-General. E. A. D'A. Thomas to be an A.A.G. in India. G. Stanley, C.B., to be an Assistant Director of Supplies and Transport.

**Austria-Hungary.** *Imperial Manœuvres of 1908.* — The centre of this year's Imperial Manœuvres was the small Hungarian village of Veszprim, the regular theatre of the operations being Hajmáskér, a village situated not far from Veszprim, and the environs of the Balaton which, with its contiguous swampy district, occupies a

**Austria-Hungary.**

surface of 1,320 kilometres square. The Bakonyer Forest traversing the country to the north of the Balaton in a north-westerly direction, forms a formidable barrier for an army coming from the south. The direction of the manœuvres was at Hajmáskér, whilst the headquarter staff was installed at Veszprim.

The hypothesis was as follows: Vienna, transformed into an armed fortress, is invested by the Ist and IInd Armies of the Southern Force (Red); the bridge-head at Pressbourg is also threatened. The Ist Army of the Northern Force (Blue), interned in the capital, awaits important reinforcements, which will allow it to take the offensive. A IIIrd Army of the Southern Force is marching on Pápa in order to prevent all attempts at landing. The Northern Force opposes it with its IInd Army, formed by the Vth Army Corps at Komárom, the IVth Army Corps at Buda Pesth, and an infantry division which has retired without fight in face of superior hostile forces.

On the 14th September the two armies received telegraphic orders to attack the enemy—orders which they could not comply with on that day because their transport and artillery parks were not close enough. The 15th of September was, therefore, necessarily a day of rest; Commanders-in-Chief were only able to send out scouting detachments of a maximum strength of a company or squadron.

Intelligence received on the 15th September caused the Commander of the IInd Army (Blue) to assemble his forces, scattered over a distance of 70 kilometres and separated by a wooded mountain, near Veszprim, and to fall on one of the enemy's units separately and overwhelm it by numerical superiority. He entrusted the protection of his right flank to the 14th Infantry Division, which pushed on to Batot by Zircs. To the 33rd Infantry Division, which was the most advanced, was confided the task of preventing all attempts at the two hostile separated units to unite, and to ensure the concentration of its own army. The Commander of the Red Force, on the other hand, ordered the two separated units to unite at Veszprim on the 17th September. The army corps thus combined should then take the offensive against the weaker opposed forces and advance beyond the right bank of the Balaton.

The hostile armies started on the 16th September at dawn. Fighting took place in the morning round the passages of the Sarviz, which had been occupied the previous evening by weak detachments of the Red force. A Blue infantry battalion was transported to Stuhlweissenbourg by rail; the cavalry Landwehr Division carried on a dismounted fight at Táez; reinforcements of the 40th Landwehr Infantry Division came up in time, and the Red, or Southern, Force could no longer dispute the passage of the Sarviz.

The 33rd Infantry Division (Blue) occupied the heights of Szent-Tstvan, which made a magnificent defensive position, and was rendered almost impregnable to an enemy approaching from the south by means of entrenchments. Whilst, however, this division awaited the attack of the enemy's forces, signalled from the south-east direction, the 2nd Cavalry Division (Red) advanced so rapidly and so skilfully that they appeared unexpectedly in rear of the 33rd Division, who had to turn about, and the cavalry division was eventually forced to retire on Vamos owing to the heavy fire of the enemy's machine guns and light artillery; but

**Austria-Hungary.**

it had attained its object. The westerly forces of the Red advanced up to the Városötd, Nagy Vázsony, Meneshely line, with its right resting on the northern bank of the Balaton.

The events of the 16th September caused the Commander of the Blue Force to decide on attacking the combined hostile army corps with superior numbers. This plan was, however, thwarted by a night attack of the Red Force, of which the 33rd Infantry Division (Blue) was the objective. The Commander of the 32nd Infantry Division (Red) rested his troops during the afternoon and left at 10 p.m. taking the heights of Szent-Tstván as his objective. He got there unperceived at midnight, formed up his forces before the enemy's front and left flank, and surprised the sentries, the enemy retiring in haste on to the heights of Hajmáskér. When morning came, the 33rd Infantry Division (Blue) was relieved by the 14th Landwehr Infantry Division, who attacked the enemy's flank and forced him to retire. The XIVth Army Corps (Red) arrived at 1 p.m. near Veszprim and at once proceeded to the attack of the southern outskirts of the Bakonyer Forest in three columns. Although the right wing gained ground, the left was unable to advance. The IVth Army Corps (Blue) routed its opponents, the 41st Infantry Division and the 4th Cavalry Brigade, changed direction to the west, and found itself opposed by the 32nd Infantry Division and the 2nd Cavalry Division. These latter had to retreat to Lepseng, and were there held in check. To the west the Red Force gained the upper hand and finished by occupying the Ratot-Megy Negy line, the Blue Force holding the line Hajmáskér, Szent-Tstván, supported in rear by the IVth Army Corps.

The 18th September brought about a decisive battle. Ratot was carried in the morning by the Blue Force, but at the same time the 36th Infantry Division (Red) took up a fresh position to the west of that place. Heavy fighting took place with alternate success round the heights of Hajmáskér. The Blue Force took the offensive on the left flank to the south, when the headquarters captive balloon signalled the cessation of the manœuvres.—*Armee et Marine.*

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**Germany.**

*The Imperial Manœuvres of 1908.*—The German Grand Manœuvres took place this year in the country situated between Metz and Strasbourg. The military situation was a very simple one. A Red Army was formed at Metz from the XVIth Army Corps and a Bavarian Infantry Brigade quartered in that town, and by a cavalry division formed from Prussian, Baden, and Würtemburg Regiments, under the command of General von Prittwitt; and a Blue Army was formed at the commencement of the manœuvres by the XVth Army Corps, under the command of General von Gilgenheimb, and a Bavarian cavalry division.

The first day of the manœuvres was devoted to reconnaissance, and the direction of the manœuvres had so arranged matters that it was absolutely impossible for the main bodies of the troops to meet that day. Thus only cavalry patrols and military cyclists advanced along the roads towards the enemy, some of them did more than 100 kilometres

**Germany.**

(about 60 miles). These were followed by complete squadrons, whose duty it was to act as a support to the patrols, and to drive off the enemy's patrols. These squadrons were reinforced by some motor cyclists and motor cars, to carry intelligence regarding the enemy as quickly as possible to the Commander-in-Chief, whose decisions were often based on this first intelligence. The reconnaissance was very ably managed by the cavalry and the cyclists, and the two armies gradually drew close to one another. A new method of marching was practised with great success. Formerly men marched in the morning up to the afternoon without halts, but this year the marching was done in several stages. The men marched from the morning till midday; the troops then halted for two hours, the men rested, made soup or received their dinners from the mobile field kitchens, and the horses were fed and watered. The men then fell in again and marched up to 5 p.m. After a fresh halt, the march was continued up to 8 p.m. In this way the troops were not too fatigued, and the infantry of the XVIth Army Corps marched 60 kilometres (about 38 miles) the first day.

It was at midday on the second day, the 8th September, that the two armies met. The XVth Corps had advanced to Lellingen, and occupied the commanding heights of Lellingen and of the Vahl Ebersing Mountain. The commander of the Red side, General von Prittwitt, attacked at once, and his regiments advanced deployed on the strong hostile position. At that moment the Bavarian cavalry division emerged from the Beilwald Wood on the right flank of the Red side. The charge was well managed, but the debouching of the regiments from the wood, the forming up for the charge, and the charge itself, had given time to the regiments of the XVIth Corps to get ready; machine guns were thrown into the skirmishing line, two batteries arrived at the gallop, up with the infantry, and so furious a fire of guns, rifles, and machine guns was directed on the charging cavalry that not one of them could have penetrated the hostile line.

After repulsing this charge the Red regiments again advanced, whilst the Red cavalry division advanced from Lixingen against the right flank of the Blue Army. In face of this superiority, General von Gilgenheimb commenced a retreat and took up only one position, with the rearguard on the Bischdorf Mountain. This mountain was then attacked and taken by the Red force, but the period of this fight had given the necessary time for the Blue's main body to retire in good order on Gross Faenchen.

The third day brought with it the first victory for the Blue force. The direction of the manœuvres had given permission to General Gilgenheimb to make use of the 2nd Bavarian Division. The General immediately ordered the commander of that division to join him, and in a forced march of over 50 kilometres, the Bavarians effected the junction, and after their arrival General von Gilgenheimb took the offensive. General von Prittwitt had concentrated his corps on the heights of Lellingen and Vahl Ebersing and did not wish to abandon this strong position without an obstinate resistance, and the regiments posted there held to their positions until the Blue force attacked with the bayonet.

It is doubtful if, in reality, this attack would have succeeded. The attacking regiments had to pass through a valley and climb a hill without cover, and the rapid fire of the enemy would have caused terrible losses.

**Germany**

But even if the attack had been successful, the defending troops would have fallen to the last man, and the attacking division, or, more properly speaking, the remnants of the division, would no longer have been available for any further duty the fight might have demanded. The umpire, however, ruled that the attack of the XVth Army Corps had succeeded because the 2nd Bavarian Division threatened to turn the left flank of the XVIth Army Corps. After having seized Maxstadt, General Prittwitt then ordered a retreat on Saint-Avold. The arrangement of this retreat, after the obstinate combat, was perfect.

The last day of the manœuvres found the XVIth Army Corps in the position : Gulgenberg—Schnauberg—Momersdorf—Wirtshans—Sautch—Tafann, occupied in fortifying this position with trenches for skirmishers and emplacements for guns. The reserves were placed behind the left flank, because on that side the heights of Heckenberg and Wendelberg—both heavily wooded—facilitated the enemy's attack. The battle commenced by a fight of the two cavalry brigades, which met near Lubeln, and in which the Blue brigade (7th and 15th Dragoons) were hurled back by the Red brigade (21st Dragoons and 11th Uhlans). After receiving the necessary information regarding his adversary's position, General von Gilgenheimb ordered the XVth Army Corps to march on the front of the enemy's position whilst the Bavarian division should turn his left flank, after passing through the Oberweise ravine. But, unfortunately for the Blue force, the charge of the Bavarians was delivered too soon, before the regiments of the XVth Army Corps had arrived. The Bavarians passed the ravine, climbed the height, and drove back the 130th Infantry Regiment, which had occupied the outskirts of the ravine. The Bavarians, encouraged by this success, pursued and attacked the main position without awaiting the arrival of the XVth Army Corps, whereupon General von Prittwitt attacked them vigorously on two sides with his reserves, and the Bavarians were hurled back into the ravine. The premature charge of the Bavarians compelled the regiments of the XVth Army Corps to hurriedly pass over the crest of the heights in column, and to open out under the fire of the enemy's artillery, in order to come up as quickly as possible and to prevent a total defeat of the isolated Bavarian division, which action would undoubtedly have cost them many men. After deploying, the regiments advanced, and the 60th Regiment turned back the Bavarians, who again climbed the ravine. At this formidable shock, of two divisions against one, the Red force was obliged to give way, and, after a vigorous resistance, the troops on the left flank retired on Niederweise. The Prussians and Bavarians were already attacking this position when the "Halt!" signal concluded the fight and the Manœuvres of 1908.

With regard to these manœuvres it must be admitted that the troops of the XVth and XVIth Army Corps, as well as the Bavarians, showed themselves to be thoroughly efficient, as is always the case with these frontier troops, and well maintained the high reputation they enjoy in Germany. The discipline, under fire and on the march, was marvellous, and the dispositions of the commanders of both sides showed such thorough sureness and forethought that the Emperor may well congratulate himself on the possession of two such generals as von Prittwitt and Gilgenheimb.

**Germany.** Great importance, in these manœuvres, was given to the supply of the troops, and three columns of motor wagons were formed to carry out the transport for the XVIth Army Corps and its cavalry division. During these manœuvres, too, serious experiments were made for the first time with motor cyclists, of whom 150 were attached to the troops, and who did wonderfully well. In conclusion, it must be said that the warlike exercises were very ably arranged by the Grand General Staff and carried out by the commanders and their troops, and that the words of praise and acknowledgment pronounced by the Emperor, in his criticism to the troops assembled for these manœuvres were true, just, and well-deserved.—*Armée et Marine.*

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*Changes in the Armament of Mounted Troops.*—The endeavours of the German Military Administration to modernise the armament of the mounted branches have, after various experiments, led to the following results :—

In the place of the 88 carbine various cavalry regiments have, experimentally, carried a new weapon, corresponding to the infantry rifle and like it in appearance, but is shorter in the butt and barrel, and is altogether handier than the infantry weapon. It appears, however, to be more difficult to carry. The most practical method of carrying it would appear to be the same as cavalry men have hitherto carried the sword, which must eventually be replaced by a short straight sidearm. The carbine itself will be protected from damage and weather by means of a leather cover. Three kinds of sidearms, in the same form as the infantry sidearm, were experimented with, which only differed in length and were hung to the belt by means of a short strap. One of medium length (rather longer than that worn by men of machine gun detachments, and somewhat shorter than the infantry sidearm) would be the most useful.

The object of this transformation of armament is as follows :—The armament should be such that, without increasing the burden for the horse, and impairing the mobility of the rider, the cavalryman should be able to bring the fire-action to a successful issue, and should therefore be armed with a sidearm for fixing on the carbine, to take the place of the lance for dismounted action.

The field artillery have only, up to the present, been given the 88 carbine as a tentative measure. The mounted artilleryman carries the carbine slung on his back from the right shoulder to the left hip, muzzle upwards.—*Allgemeine Armée-Correspondenz.*

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**Japan.** *Tactical Methods.*—*Streffleurs Militärische Zeitschrift* devotes an article to a study of the Japanese Imperial Manœuvres which took place last year, in which, after a short account of the operations, it summarises very clearly the tactical methods adopted by the troops of the three arms and the lessons to be deduced from them. These observations are of such interest that it would appear advisable to quote them in full :—

*Umpires.*—Two generals or two colonels were appointed as umpires for each side; further, six generals and colonels were available to be

Japan.

employed as umpires according to requirements, and officers of the staff were allotted them as assistants. It was apparent that, considering the numerical strength of the two forces, the extent of their fighting lines and the difficulty of obtaining a good view of the manœuvre terrain, the number of the umpires was not sufficient. It resulted from this that situations suddenly arising were not known in time and correctly decided, and that the uniformity of the decisions given was not above reproach.

*Action of the Three Chief Arms—Infantry.*

The characteristic traits of the infantry fight, whose technique has not greatly altered since the war, are:—

*Attack.*—Exact and precise reconnaissance of the hostile position; temporary position outside the enemy's radius of action; scientific reinforcement of that temporary position; quick, energetic, and decided execution of the attack from the temporary position up to the assault; advance by rushes, running over exposed ground; long rushes, opening of fire on the enemy (especially according to the nature of the ground); individual fire, and also volleys directed against the artillery.

*Defensive.*—Skilful choice of the position; thorough employment of scientific methods for reinforcing the position; marking out distances and making sketches showing the distances; greater extent of length of trenches than the force immediately available requires; placing all the forces of the first line in position before the commencement; counter attacks from the front when the enemy has got up close.

*Employment of Reserves.*—Both in the attack and in the defence but few of the reserves should be diverted, and should be immediately replaced.

*Infantry Machine Gun Detachments.*—Every infantry regiment was, as a tentative measure, allotted a machine gun detachment for the manœuvres. The machine guns were used in the attack, in the defence, and in security service. They were never employed isolated, but most of the time in groups of from 2 to 6 guns. On the march they were at the head of the advanced or at the end of the rear guard, according as the force was advancing or retiring. In the attack the machine guns were brought into the firing line and were carried by three men by the legs of the tripod spread out. They advanced by rushes and took up new positions at the same time as the firing line and at once opened fire. In the defensive the machine guns were placed either in the same line as the infantry or behind cover specially made for them and which masked the gunners. Changes of position were frequent, according to the situation of the fight. The dominating idea was always to cover as rapidly as possible all changes of position. In accordance with the spirit of the new machine gun regulations, they were never used to supplement artillery, but as a concentrated infantry. Their employment in this sense was most skilful; the appearance of an extended or a close formation of a hostile unit was every time saluted by the crackling of machine guns.

*Cavalry.*

All cavalry regiments went to the manœuvres with only three squadrons, the fourth squadrons being at that time in Korea. Hardly any-

**Japan.** thing could be observed of the cavalry action, the ground being against their useful employment. It seemed, nevertheless, that they were frequently employed as mounted infantry with its own machine gun sections.

*Artillery.*

Artillery regiments had only four batteries. They were deficient both in trained gunners to handle the new field gun (Midji ·38) and drivers. The artillery was employed during the manœuvres quite differently to during the last war. They only chose positions for direct fire. The regiment was never split up, and massed artillery was often employed. Positions were selected quite close to the enemy, and batteries frequently took up positions under hostile artillery and infantry fire. In both the defensive and the offensive artillery were in the infantry firing line.

From the little than could be seen during the manœuvres of the employment of the artillery, it is too early to at once anticipate changes to be introduced into the tactical conduct of that arm. The particular circumstances influencing that employment of the artillery should first be cleared up. In the first place was the nature of the ground. The field of fire was often very restricted, so that it was necessary to approach to short range for direct fire, and indirect fire was difficult owing to the nature of the ground. The latter was so flat that the frequent cover and existing bushes made not only the observation of the shots very difficult, but they also hindered indirect fire. On the other hand, however, the ground was favourable to employment of artillery in small groups, because the latter, owing to that very cover, could more readily find favourable positions than whole regiments were able to do. It must, however, also be taken into consideration that the existing roads capable of facilitating the movement of artillery were but few.

Further, the positions for direct fire and taking up positions at short range may have been caused by the providing of shields to the new guns. In any case, a general tendency was noticeable to employ artillery in a more offensive sense, and with less consideration for the resulting losses than was the case during the war.

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**Montenegro.** *The Military Forces.*—The total population of the small principality is about 250,000 inhabitants, and it is therefore a Power of purely local importance, which has only sprung into notice on account of the possible entanglements in Bosnia and Northern Albania. The country lies in Austria's sphere of influence, but it would be a mistake to suppose that, on account of its smallness, it would not be a very tough opponent, as indeed its history has often enough demonstrated.

Prince Nikita has rightly recognised that his country can hope to permanently maintain her position only through the increase of her military strength. Up to 1876 there was no army whatever. In the event of war all men capable of bearing arms were called out. They took to the hills together, and dispersed as soon as the war was over. Now a Regular Militia system has been introduced. The peace strength, with the Gendarmerie and the Prince's Lifeguards, amounts to about

**Montenegro.**

2,000 men. There are two instruction battalions at Cetinje and Podgoritza, each consisting of 16 officers and 60 non-commissioned officers. To these must be added two instruction batteries at Niksitsch, with 3 officers and 14 non-commissioned officers, as well as a small Pioneer instruction company and 2 machine gun sections, for training for those branches of the service.

These instruction troops form the nucleus for those liable to military service, who are called out every year for four months. The army, consequently, consists of a Militia, whose short period of service is compensated for by the natural dexterity of the mountaineers. The country is divided into 11 brigades, each of 6 battalions and 1 battery, with some pioneers, cavalry, and machine guns. The war strength is reckoned at 50,000 men. Each brigade district has a special school for non-commissioned officers, and at Cetinje there is one for officers.

It will thus be seen Montenegro follows a system somewhat similar to the Swiss. In comparison with the population, the army of the "Black Mountains" is very strong for war. Boys of 17 and men of 60 years fight shoulder to shoulder. In case of necessity the brigade would be called out and formed into larger units.—*Allgemeine Armée-Correspondenz.*

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# NAVAL AND MILITARY CALENDAR.

## NOVEMBER, 1908.

4th (W.) 2nd Bn. Somersetshire Light Infantry left England for Malta in the *Rohilla.*

7th (Sat.) Launch of First-class Battle-ship *Collingwood* at Devonport.

" " An unsuccessful attempt to murder the Lieutenant-Governor of Bengal was made in Calcutta.

8th (S.) The XVIth Brigade R.F.A. left South Africa for India in the *Alexandria.*

9th (M.) H.M.S. *Diana* arrived at Plymouth from the Mediterranean.

" " H.M. The King celebrated his Birthday at Sandringham.

10th (T.) Launch of First-class Battle-ship *North Dakota* at Quincy, Massachusetts, for U.S. Navy.

12th (Th.) 2nd Bn. Somersetshire Light Infantry arrived in Malta from England in the *Rohilla.*

" " 4th Bn. Worcestershire Regiment left Malta for India in the *Rohilla.*

14th (Sat.) The death of the Emperor of China took place at Pekin.

15th (S.) The death of the Dowager Empress of China took place at Pekin.

16th (M.) H.M.S. *Diana* paid off at Devonport.

17th (T.) " " recommissioned at Devonport for Mediterranean.

" " 4th Dragoon Guards arrived in England from South Africa in the *Goorkha.*

23rd (M.) The XVIth Brigade R.F.A. arrived in India from South Africa in the *Alexandria*.

" " 3rd Bn. Middlesex Regiment left Hong-Kong for Singapore in R.T.M.S. *Dufferin*.

24th (T.) H.M.S. *Diana* left Plymouth for Mediterranean.

25th (W.) The XVIIIth Brigade R.F.A. arrived in South Africa from England in the *Braemar Castle*.

" " 4th Bn. Worcestershire Regiment arrived in India from Malta in the *Rohilla*.

28th (Sat.) H.M.S. *Queen* arrived at Sheerness from the Mediterranean.

" " 3rd Bn. Middlesex Regiment arrived in Singapore from Hong-Kong in R.T.M.S. *Dufferin*.

30th (M.) 2nd Bn. Royal West Kent Regiment left Singapore for Lebong in R.T.M.S. *Dufferin*.

# FOREIGN PERIODICALS.

## NAVAL.

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AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens*. No. 12. Pola: December, 1908.—"Medical Lessons from the Russo-Japanese Naval War." "The Influence of the Sight Upon the Accuracy of Firing." "More of the "Huller Affair."" "Prize Essays in the Italian Navy." "The Russian Naval Estimates for 1908." "Cable Manufacture after the Rolled Iron System of the Borsig Firm in Berlin."

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Manning the Navy." "History and Golden Book of the Corporation of Marseilles Pilots" (*continued*). "The Engineers in the Principal Navies." "The Question of Mines and the Hague Conference." "State of Battle-ship Construction at the Moment of the Launch of the First German 18,009-ton Battle-ship *Ersatz Bayern*, 7th March. 1908." "Petrol and Strategy."

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*Streffleurs Militärische Zeitschrift.* Vienna: November, 1908.—"Politics or Strategy? Critical Study of Austria's Warsaw Campaign and the Demeanour of Russia, 1809." "Proposals for the Organisation and Employment of Mortar Units." "Musketry Regulations of the Principal European Powers" (*concluded*). "Military Leaders on the Battle-fields of the Monarchy, Excluding Hungary" (*concluded*). "The New Montenegrin Defence Law." "The Importance of the Battle of Trencsin, 4th August, 1708." "Foreign Army Intelligence." "Naval Intelligence." "Science Notes."

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## NOTICES OF BOOKS.

*A History of the Peninsular War.* Vol. III. By CHARLES OMAN, M.A. Oxford: The Clarendon Press, 1908. Price, 14s. net.

Thoughtful students will cordially welcome the appearance of the third volume of Mr. Oman's exhaustive work, and none the less, perhaps, in that it deals very largely with events in which the British Army was not immediately concerned, and therefore the subject of less general study among Englishmen, although we are now, perhaps somewhat late in the day, beginning to realise the influence which the operations of the Spanish troops, too often looked upon merely as side issues of no real importance, had upon the general result of the campaign during which they took place. The present volume then deals with the events of the sixteen months from September, 1809, to December, 1810, from Wellington's arrival at Badajoz on his retreat from Talavera, to the retreat of Masséna from the front of the lines of Torres Vedras, and marks, as the author reminds us in his preface, the turning point of the whole war. Professor Oman deals at some length and in unusual and altogether fresh detail with the defence of Gerona by Alvarez, and with the unfortunate events of the ill-conceived and worse-conducted campaign in La Mancha, which resulted in the conquest of Andalusia. The author, too, gives us a good idea of the unfortunate results of the vicious and inexplicable system created by Napoleon when he found himself unable to proceed in person to the Peninsula, there assume command of all the scattered and disunited armies, and himself direct the whole of the operations. Under this indefensible and—from a military point of view—ruinous system, the military authority in the Peninsula was divided between the Commander of the

Army of Portugal, who controlled but three army corps and the garrisons in Leon and in Old Castile; the King, with his army of the centre; Soult, in Andalusia; and the so-called military governors in Catalonia, Aragon, Navarre, Biscay, and Burgos. The difficulties by which Masséna, from the very moment of his assumption of the command of the Army of Portugal, was beset, are very clearly and fairly put forward, but it must at the same time be admitted that while he was given too small a force for the heavy task which his imperious master had set him, Masséna was no longer the man to make the best use of his materials. None the less, neither he nor the Emperor were in any way prepared for what Professor Oman calls "Wellington's triple device for arresting the French advance—his combination of the system of devastation, of the raising of the *levée en masse* in Portugal, and of the construction of great defensive lines in front of Lisbon. . . . The lines of Torres Vedras might not have saved Portugal and Europe from the domination of Napoleon, if the invading army had not been surrounded on all sides by the light screen of Irregular troops, which cut its communications and prevented it from foraging far afield. Nor would Masséna have been turned back if the land through which he had advanced had been left unravaged, and if every large village had contained enough food to subsist a brigade for a day or a battalion for a week."

Especially minute and clear is the account of the first check at Busaco or, as the author would have us call it, Bussaco; while the famous lines of Torres Vedras are so described—as first designed and as ultimately fashioned—that the utter hopelessness of their capture becomes very apparent.

Professor Oman has yet four years of the Peninsular War to chronicle, and he seems determined to spare no pains to present a minute, dispassionate account of the Homeric struggle. If his prose has not the ring of Napier, it conveys the impression of greater accuracy and of more careful elaboration of detail, and this, perhaps, after all, is what is chiefly required in a history. Indeed, with the conclusion of the work which the author has set himself, we should have the last word on Wellington's operations in the Peninsula. The maps and plans are excellent, entirely worthy of their setting; and among the illustrations are some curious and interesting examples of Spanish uniforms as worn at different periods.

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## PRINCIPAL ADDITIONS TO LIBRARY DURING NOVEMBER, 1908.

*Education and Training of the Japanese Infantry.* General Staff, War Office, August, 1908. Crown 8vo. (Presented.) (Harrison & Sons.) London, 1908.

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*Vol. II. Regulations and Orders for the Indian Army.* 8vo. 1s. 2d. (Presented.) Calcutta. 1908.

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*Guide to Promotion for Officers in Subject "A" (Regimental Duties).* By Captain R. F. Legge. 2nd Edition. Crown 8vo. 4s. (Presented.) (Gale & Polden.) Aldershot, 1908.

*Les Mitrailleuses. Divers cas d'emploi et notament au point de vue tactique en liaison avec les autres armes.* Conference de Garnison donnée à Bruxelles. By Le Major J. Godts. 8vo. 2s. 9d. (Emile Godts.) Laeken, 1908.

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*The Laws of War on Land (Written and Unwritten).* By T. E. Holland. 8vo. 6s. (Clarendon Press.) Oxford, 1908.

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*Telegraph and Telephone. Manual of Instruction in Army Telegraphy—Field Telegraphs.* 8vo. London, 1901.

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*Telegraphy and Telephony. Instruction in Army Telegraphy and Telephony. Vol. I.—Instruments.* 8vo. London, 1908.

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## COMPILED BY THE GENERAL STAFF, WAR OFFICE.

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PREFATORY NOTE.

This Pamphlet will be issued quarterly, in April, July, October and January. Its purpose is to draw the attention of Officers to British and Foreign publications of Military interest which are likely to assist them in their professional work. Copies of the pamphlet will be distributed to the Headquarters of Commands, Educational Establishments, Units and Reference Libraries.

## PART II.

### MAGAZINE ARTICLES.

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### AERIAL NAVIGATION.

The Problem of Flight (technical). E., 19th and 26th June, 3rd, 10th, 17th, 24th, and 31st July, 7th, 14th, 21st, and 28th August, 4th September.

Notes on the maximum useful weight which can be lifted by an Aeroplane. By Captain P. Girardville. R.d'A., May.

The Present State of Aeronautics. By Belgian General Staff. B.P.B.M., 15th June, 15th July, 1st and 15th August.

Infantry Fire at Dirigible Airships. By H. Rohne. M.W.B., 7th July.

Dirigible Airships. By P. Banet Rivet. R.D.D.M., 15th July.

Strategy and Dirigible Airships. L.B.M., 12th July.

Application of the Airships to Military Purposes. M.W.B. 18th July.

The Zeppelin Airships. E., 31st July.

What can we learn from Count Zeppelin's Flight? M.W.B., 11th August.

Recent Aeroplane Experiments. E., 14th August.

Dirigible Balloons. Their Employment on the Offensive, and Methods of Firing at them. By Lieutenant Archen. (To be continued.) J.S.M., 15th August.

Airships in War. By Huggenberger. M.W.B., pp. 2426, 2453.

The Problem of Aerial Navigation. By Professor Simon Newcomb. N.C., September.

### ARTILLERY.

More about the Q.F. Gun. By Major Emile Manceau. R.M.S., May, June.

Recoil-Absorbing Gun Carriages, their Construction, etc. By Captain Commandant A. Collon. R.M.B., March, April.

Vickers' Ordnance at the Franco-British Exhibition. E., 26th June.

The Independent Line of Sight in Non-Recoil Field Guns. By Rudolf Kühn. O.M.Z., June.

The Re-organisation of the Austro-Hungarian Field and Mountain Artillery. O.M.Z., June.

Shooting at Targets necessitating large Angles of Sight. By Captain Johann Schmidt. M.A.G., June.

Quick-Firing Artillery. A Comparison between the French and German Field Guns. By a former Battery Commander. L.S.M., 15th June.

A Description of the Field Firing carried out by the 19th Brigade of Field Artillery in 1906. By General Goiran. R.d'A., May, June.

Re-armament of the Portuguese Mountain Artillery. By Captain J. Nunes Gonçalves. R.d'A., May.

Gun Shields Improvised by the Russians in Manchuria. Translated from Russian by Captain M. C. Curey. R.d'A., May.

Heavy Calibre Cannon in the Field. By Major H. L. Hawthorne U.S.A., May-June.

The Location of Mortar Batteries. By Major J. K. Cree. U.S.A., May-June.

An Automatic Range and Deflection Corrector. By Captain S. G. Shartle. U.S.A., May-June.

Modern Armour and its Attack. By Captain T. J. Tresidder. U.S.A., May-June.

Medium Howitzers as Part of the Equipment of Heavy Artillery. By Colonel H. C. Simpson, C.M.G. P.R.A.I., July.

The Effect of Artillery Fire in the Manchurian War. By Lieut.-General H. Rohne. M.W.B., 9th July.

Field Artillery Tactics. By Captain Pedro Jevenois. M.Art., July.

Questions of Artillery. A *Précis* of Recent Writings by Generals Rohne and Langlois. L.B.M., 12th July.

The German Field Gun, Model /96, converted. By Rudolf Kühn. M.A.G., July.

Horse Artillery and the Light Field Howitzer. By Major Franz Spur. K.M., June.

Up-to-date Artillery Training. By Captain von Bracht. M.W.B., 23rd July.

The Heavy Artillery of a Field Army: a Comparison. By Colonel F. G. Stone. J.U.S.I., July.

Heavy Artillery. R.M.S., July.

The Mobility of Horse Artillery. By Colonel A. Andrew. K.M., July, August.

The 2·95-inch Deport Field Gun at the Franco-British Exhibition. E., 7th August.

The Tactics of Field Artillery, in accordance with the Regulations for the German Artillery. By Lieut.-General G. Rohne. B.P.B.M., 15th July, 1st and 15th August.

The Field Scale. By Captain H. W. Hill. P.R.A.I., August.

The Theory of Ballistics. Practical Experiences. By Major Charbonnier. R.d'A., June.

Questions of Artillery. Four- or Six-gun Batteries. Editorial. L.B.M., August.

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## CAVALRY.

The New Recruiting Law in France, with Special Reference to Cavalry. By René Chauveau. L.S.M., 1st June.

Cavalry in Reconnaissance and in Contact. Editorial. R.C., May, June, July.

Field Exercise and Methods of Instruction. The Instruction of Officers. By Lieut.-Colonel Monsenergue. R.C., May.

The Belgian "Military International" of 1908. By Pimpol. L.B.M., May.

The Training of Horses. By Veterinary-Major C. Chomel. L.S.M., 1st and 15th July, 1st August.

Training of Cavalry Brigades, Divisions, and Corps. By "l'Irrégulier." R.C., June.

The Kurdish Militia Cavalry. By Major F. R. Maunsell. C.J., July.

French Cavalry, Regular and Irregular, in Morocco. By Colonel D. F. Lewis. C.J., July.

Picketing Gear for Cavalry. By Brigadier-General H. D. Fanshawe. C.J., July.

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The Swedish Cavalry Divisional Manœuvres of 1907. By Captain Count Wrangel. K.M., July, August.

Cavalry Pioneers in Germany. R.M.E., July.

"Anarchy." Editorial. R.C., July.

An Operation by the Japanese Cavalry. Editorial. R.C., July.

Equitation. By Lieutenant J. Pourchet. R.C., July.

The Cavalry of Two Years' Service. By General de Négrier. R.D.D.M., 15th August.

The Chances of Cavalry Masses in the Flank and Rear of an Enemy. By Captain Ignar Rodic. O.M.Z., August.

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## DEFENCE: HOME AND IMPERIAL.

The British Navy: Its Chances of Success in the event of a War with Germany. By Commandant Davin. Q.D., 1st July.

## EMPIRE, THE.

The Anglo-Egyptian Army. Editorial. L.S.M., 1st and 15th June

## FORTIFICATION AND MILITARY ENGINEERING.

Bridging the Medway at Chatham. R.E.J., July.

Headcover. By Major A. L. Schreiber, D.S.O., R.E.J., July.

Field Fortification in the Russo-Japanese War. Translated from M.A.G. by Captain C. Otley Place. R.E.J., July.

Essential Considerations for the Execution of Field Fortification by Infantry. O.M.Z., June.

Instructions regarding the Search for and Destruction of an Enemy's Fougasses and Mines. By Captain Nikolaus Waldmann. M.A.G., June

Dobner's Fish-bellied Girders (technical). By Captain Josef Hnevkovsky. M.A.G., June.

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## HISTORICAL.

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Some Notes on the Operations of Lee and Grant in Northern Virginia in May and June, 1864. By Lieut.-Colonel J. E. Edmonds, *p.s.c.*, R.E. R.E.J., July.

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The Campaign of Valmy. By E. P. R.H., June, July.

The War of 1870-71. March of the German Forces from Sedan on Paris. Investment of Paris. By French General Staff. R.H., June, July.

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The French Expedition to Egypt in 1798. E.R., July.

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Famous Leaders of Cavalry: Seydlitz. By Colonel H. de B. de Lisle. C.J., July.

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The Battle of Zorndorf. M.W.B., Suppl. 7, p. 293.

Waterloo, with New Documentary Information. By General F. Goiran. R.M.G., August.

1813. By Field-Marshal Graf Schlieffen. V.T.H., Vol. III.

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## MEDICAL AND SANITARY.

The Medical Service with Regimental Units, with Special Reference to Infantry Expeditions in German South-West Africa. By Oberarzt Dr. Ruckert. D.M.Z., 20th March.

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Organisation of the Red Cross Service in Germany, in Peace and War. I.R. (Suppl. 113).

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The Permanent Characteristics of an Army. By H. Belloc. S.G.R., June.

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Tsushima. By Captain Laur, with remarks by Lieutenant Baudry. R.M.G., June, July, August.

Smokeless Powder. E., 10th July.

Some Causes and Effects of Modern War. By Lieutenant H. G. de Watteville. P.R.A.I., July.

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Proceedings of the N.D.A. S.G.R., July.

Following the Moorish Sultan. S.G.R., July.

The Normal Automatic Gun. Sjögren System. E., 24th July.

Military Geography. J.U.S.I., August.

The Rational Feeding of Troops. L.R.I., 15th August.

Our National Arm. By Randolph Carlyle. C.Mag., September.

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## MOTORS AND MOTOR TRACTION.

Military Motor Traction in Various Countries. S.Z.A.G., June.

Military Automobilism (Heavy Weight) in Germany. By French General Staff. R.M.E., June.

Automobilism from a Military Point of View. J.S.M., 15th July and 1st August.

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Automobiles from a Military Standpoint. By Captain Alliney Emilio. R.M.I., 16th August.

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## ORGANISATION AND ADMINISTRATION.

The French War Budget for 1908. J.S.M., 15th June.

The Evolution of the Recruitment of the Army. By General Pédoya. J.S.M., 15th June, 1st and 15th July, 1st August.

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The best way of Organising and Maintaining a Reserve of Efficient British Officers for the British Forces at Home and in India, including the Indian Army. By Captain C. A. L. Yate. J.U.S.I., June.

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The Russian Supply Service in the Manchurian War. By M. Charles Rupp. R.I.M., June.

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The new English Military Organisation. By Colonel Camille Favre. R.M.S., June.

Military Reform in Belgium. By French General Staff. R.M.E., June.

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The Present Situation in China as regards the Development of the Army. By Captain Seidel. O.M.Z., July.

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The Correlation and Co-operation of Infantry and Artillery in Action. M.W.B., 4th June.

A Treatise on the Psychology of Troops and their Leaders. By Major Gaucher. L.S.M., 1st and 15th June, 1st and 15th July, 1st and 15th August.

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Studies in Applied Tactics. Cavalry in Battle, 15th and 16th August, 1870. By P. Lehautcourt. Translated by Major E. Makins. J.U.S.I., June, July, August.

Japanese Opinion on the Employment of Machine Guns. Translated from the *Militär-Wochenblatt*. J.U.S.I., June.

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Infantry Long-Range Fire. By O.B. L.B.M., 21st June, 26th July.

Mounted Scouts acting with Infantry at the French Manœuvres L.B.M., 28th June.

Changes which have become necessary in Infantry Tactics, according to the Reports of Army Corps Commanders of the 2nd Russian Army in Manchuria. Translated from the Russian by Major Painvin. L.R.I., 15th June.

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Garrison Manœuvres. By Henri Baraude. J.S.M., 1st July.

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Report on Foreign Manœuvres, 1907.

Military Report on Northern Nigeria, Vol. II. (Routes).

Removal of Sick and Wounded from the Battle-field.

## ABBREVIATIONS.

| Abbreviation. | Name of Newspaper or Periodical. | | Price. | Place of Publication. |
|---|---|---|---|---|
| A.F. | Bulletin du Comité de l'Afrique française | M. | 2 frs. | Paris. |
| A.F.H. | Archiv für Schiffs- und Tropen-Hygiene | ½ M. | * | Leipzig. |
| A.H.M. | Annales d'hygiène et de médecine coloniale | M. | 3 frs. | Paris. |
| A.J. | Artilleriskii Jurnal | M. | * | St. Petersburg. |
| A.M.B. | Artilleristische Monatshefte | M. | m. 2.50 | Berlin. |
| A.M.P. | Archives de médecine et de pharmacie militaires | M. | 2 frs. | Paris. |
| A.N.R. | Army and Navy Register | W. | 15 c. | Washington. |
| A.Q.R. | Imperial and Asiatic Quarterly Review | Q. | 2/6 | Woking. |
| A.S.C. | Army Service Corps Quarterly | Q. | 2/- | Aldershot. |
| A.S.M. | Allgemeine schweizerische Militärzeitung | W. | * | Basle. |
| B.Mag. | Blackwood's Magazine | M. | 2/6 | Edinburgh. |
| B.P.B.M. | Bulletin de la Presse et de la Bibliographie militaires. (Supplement to J.M.O.B.) | F. | * | Brussels. |
| B.S.C. | Bulletin international des sociétés de la croix rouge | M. | 50 c. | Geneva. |
| C.J. | Cavalry Journal | Q. | 2/6 | London. |
| C. Mag. | Canadian Magazine | M. | 25 c. | Toronto. |
| C.M.G. | Canadian Military Gazette | F. | 10 c. | Montreal. |
| C.O.J. | Colonial Office Journal | Q. | 1/6 | London. |
| Con. | Der Continent | M. | m. 1.25 | Berlin. |
| C.R. | Contemporary Review | M. | 2/6 | London. |
| D.M.S. | De militaire Spectator | M. | 1 fr. 50 | Haarlem. |
| D.M.Z. | Deutsche militärärztliche Zeitschrift | ½ M. | * | Berlin. |
| E. | Engineering | W. | /6 | London. |
| Ec. | Economist | W. | /8 | London. |
| Emp. R. | Empire Review | M. | 1/- | London. |
| E.R. | Edinburgh Review | Q. | 6/- | London. |
| F.M.F. | Feuille militaire Fédérale | V. | 40 c. | Berne. |
| F. Rev. | Fortnightly Review | M. | 2/6 | London. |
| I.M.T. | Indisch Militair Tijdschrift | M. | 1 fr. 50 | Batavia. |
| Inj. | Injeniernii Jurnal | M. | * | St. Petersburg. |
| I.R. | Internationale Revue (Armeen und Flotten) | M. | m. 3.25 | Dresden. |
| J.A.M.S. | The Military Surgeon. Journal of the Assoc. of Military Surgeons | M. | 35 c. | Carlisle, Penn. |
| J.A.S. | Journal of the African Society | Q. | 6/- | London. |
| J.D.A.M. | Jahrbücher für die Deutsche Armee und Marine | M. | m. 2 50 | Berlin. |
| J.M.O.B. | Journal militaire Officiel | M. | * | Brussels. |
| J.M.S.I. | Journal of the Military Service Institution | 2 M. | 50 c. | Governor's Island, N. York |
| J.M.S.S. | Journal of the Military Scientific Society (Russian) | Q. | 1 Ro. 50kop. | St. Petersburg. |
| J.R.A.M. | Journal of the Royal Army Medical Corps | M. | 2/- | London. |
| J.R.C.I. | Journal of the Royal Colonial Institute | M. | /6 | London. |

W., published weekly; F., fortnightly; M., monthly; Q., quarterly; V., at irregular intervals; A., annually.
* Periodicals which can only be purchased by subscription.

ABBREVIATIONS.—contd.

| Abbreviation. | Name of Newspaper or Periodical. | | Price. | Place of Publication. |
|---|---|---|---|---|
| J.S.M. ... | Journal des Sciences militaires... ... | M. | * | Paris. |
| J.U.S.I. ... | Journal of the Royal United Service Institution ... ... ... ... | M. | 2/- | London. |
| J.U.S.I. (N.S.W.) | Journal of the United Service Institution of New South Wales ... ... | A. | * | Sydney. |
| K.M. ... | Kavalleristische Monatshefte ... ... | M. | k. 2. | Vienna. |
| K.T.Z. .. | Kriegstechnische Zeitschrift ... .. | M. | m.1.50 | Berlin. |
| L.A.F. .. | Comité de l'Asie française, Bulletin ... | M. | 2.25 fr. | Paris. |
| L.B.M. ... | La Belgique militaire ... ... ... | W. | 25 c. | Brussels. |
| L.R.I. ... | La Revue d'Infanterie ... ... ... | M. | 2 frs. | Paris. |
| L.S.M. ... | Le Spectateur militaire ... ... .. | F. | 2 frs. | Paris. |
| M.A.G. ... | Mittn. über Gegenstände des Art.- u. Genie-Wesens ... ... ... ... | M. | * | Vienna. |
| M. Art. ... | Memorial de Artillería ... ... ... | M. | * | Madrid |
| M.I.E. ... | Memorial de ingenieros del ejército ... | M. | * | Madrid. |
| M.W.B. ... | Militär-Wöchenblatt ... .. ... | ½W. | 20 pf. | Berlin. |
| N.C. ... | Nineteenth Century ... ... ... | M. | 2/6 | London. |
| N.I.A. ... | Nation in Arms ... ... ... ... | M. | /3 | London. |
| N.M.B. ... | Neue Militärische Blätter ... ... | W. | 60 pf. | Berlin. |
| N.R. ... | National Review ... ... ... ... | M. | 2/6 | London. |
| O.M.Z. ... | Streffleurs militärische Zeitschrift, zugleich Organ der militär-wissenschaftlichen Vereine ... ... ... | M. | * | Vienna. |
| P.J. ... | Preussiche Jahrbücher ... ... ... | M. | m.2.50 | Berlin. |
| P.R.A.I. ... | Journal of the Royal Artillery ... ... | M. | 2/6 | Woolwich. |
| P.U.S.I. ... | Journal of the United Service Institution of India ... ... ... ... ... | Q. | 2 Rs. | Simla. |
| Q.D. . | Questions diplomatiques et coloniales... | F. | 75 c. | Paris. |
| Q.R. ... | Quarterly Review... ... ... ... | Q. | 6/- | London |
| R.A.G. ... | Rivista di Artiglieria e Genio ... ... | M. | * | Rome. |
| R.C. ... | Revue de Cavalerie ... ... ... | M. | * | Paris. |
| R. d'A. ... | Revue d'Artillerie... ... ... ... | M. | * | Paris. |
| R.D.D.M. | Revue des Deux Mondes... .. ... | ½M. | 3 frs. | Paris. |
| R. du G.... | Revue du Génie militaire ... ... | M. | 2.50 fr. | Paris. |
| R.E.J. .. | Royal Engineers' Journal ... ... | M. | 1/6 | Chatham. |
| R.I.M. ... | Revue du service de l'intendance militaire .. ... ... ... ... | M. | 2 frs. | Paris. |
| R.H. ... | Revue d'Histoire ... ... ... ... | M. | 2 frs. | Paris. |
| R.M.B. ... | Revue de l'Armée belge ... ... ... | 2 M | * | Liège |
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| R.M.G. ... | Revue militaire générale ... ... | M. | 2.50 fr. | Paris. |
| R.M.I. ... | Rivista militare italiana ... ... | M. | 2 lire | Rome. |
| R.M.L. ... | Revista militar ... ... ... ... | F. | 200 reis. | Lisbon. |
| R.M.S. ... | Revue militaire suisse ... ... ... | M. | * | Lucerne. |
| R.T.C. ... | Revue des Troupes Coloniales ... ... | M. | 2 frs. | Paris. |
| S.G.R. ... | Saint George's Review ... ... ... | M. | 1/- | London. |
| S.Z.A.G. ... | Schweizerische Zeitschrift für Artillerie und Genie ... ... ... ... | M. | * | Frauenfeld. |
| U.S.A. ... | United States Artillery Journal... ... | 2 M. | 50 c. | Fort Monroe |
| U.S.C. ... | United States Cavalry Association Journal ... ... ... ... ... | Q. | 50 c. | Fort Leavenworth. |
| U.S.I. ... | United States Infantry Association Journal ... ... ... ... ... | Q. | 50 c. | Washington. |
| U.S.M. ... | United Service Magazine (Colburn's) ... | M. | 2/- | London. |
| V.S. ... | Voyennii Sbornik (Military Journal) ... | M. | * | St. Petersburg |
| V.T.H. ... | Vierteljahrshefte für Truppenführung und Heereskunde ... ... ... | Q. | * | Berlin. |

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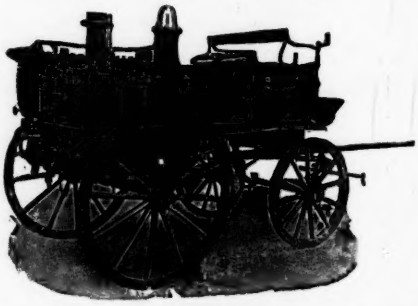

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| | | | |
|---|---|---|---|
| **Third** | G. B. STALLARD | ... | 7,629 |
| 22nd | L. F. PAGE | ... | 6,564 |
| 23rd | G. E. W. FRANKLYN | ... | 6,559 |
| 29th | G. A. CAMMELL | ... | 6,437 |

**November, 1907.**

| | | | |
|---|---|---|---|
| **Third** | F. N. M. MASON | ... | 7,441 |
| **Fifth** | E. J. MOORHEAD | ... | 7,236 |
| **Sixth** | C. W. R. TUKE | ... | 7,166 |
| 24th | J. R. PINSENT | ... | 6,493 |
| 27th | H. W. CRIPPIN | ... | 6,411 |
| 32nd | L. H. KING-HARMAN | ... | 6,372 |
| 35th | R. B. PARGITER | ... | 6,339 |

This is the second time in two years we have passed **three** out of the first **six** for Woolwich.

### SANDHURST.

**June, 1908.**

| | | | |
|---|---|---|---|
| **Fourth** | H. T. ROHDE | ... | 5,307 |
| 27th | W. G. MAXWELL | ... | 4,937 |
| 44th | H. L. MOOD | ... | 4,775 |
| 45th | H. S. F. COSENS | ... | 4,761 |
| 79th | J. M. PONSFORD | ... | 4,473 |
| 89th | B. H. BONHAM-CARTER | ... | 4,399 |
| 105th | L. B. RUNDALL | ... | 4,312 |
| 127th | J. A. BATTEN-POOLL | ... | 4,183 |
| 161st | A. E. LAWRENCE | ... | 3,985 |
| 162nd | M. ALEXANDER | ... | 3,981 |
| 167th | R. W. RUSSELL | ... | 3,940 |
| 171st | G. W. MACKINTOSH | ... | 3,897 |
| 191st | R. H. BROOME | ... | 3,733 |
| — | C. S. HILTON* | ... | 3,563 |
| — | W. N. SHIPSTER* | ... | 3,221 |
| — | J. V. DAWSON* | ... | 3,148 |

* Subsequently admitted.

### INDIAN POLICE, JUNE, 1907.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Third** | F. W. Toms | ... | 6,886 | 27th | H. W. Waite | ... | 5,980 |

### ARMY QUALIFYING, SEPTEMBER, 1908.

NINE WERE SUCCESSFUL FROM US.

### MILITIA COMPETITIVE EXAMINATION, MARCH, 1908.

Douglas Scott, Kent Artillery.
D. G. Gunn, 3rd P.W.O. West Yorkshire Regt.
A. L. Cooper Key, 5th Middlesex Regiment.
W. C. Loder Symonds, Lancashire Fd. Artillery.
R. G. Atkinson, West Surrey Regiment.
R. W. Leach, Cambridge Volunteers.
G. W. Courtney, Cork R.G.A.

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